Thomas Martin

To: GSukys, Patrick Kuefler, Chris.Perzan, pkuefler, JMORGAN, Jeffery Trevino, Christopher Black
Subject: RE: FW: COC Memo

As indicated in George's message, the Chemetco call is tommorrow at 1:00, number to be announced. In the meantime, please reply to this message with any other points or comments that need to be made on the call concerning the COC analysis or dioxin.

---------- Forwarded by Thomas Martin/R5/USEPA/US on 04/17/2001 10:39 AM ----------

George von Stamwitz <GVONSTAM@ArmstrongTeasdale.com> on 04/17/2001 10:28:04 AM

To: Thomas Martin
Subject: RE: FW: COC Memo

Hey Tom, Roy Ball has been out sick but I am told he will be in tommorrow, so lets plan on 1:00. We will forward you a call in # for 10 folks.

-----Original Message-----
From: Martin.Thomas@epamail.epa.gov
[mailto:Martin.Thomas@epamail.epa.gov]
Sent: Thursday, April 12, 2001 6:34 PM
To: George von Stamwitz
Cc: Sukys@enrd.usdoj.gov; Doyle, Andrew
Subject: RE: FW: COC Memo

I've polled our team of people and next Wednesday at 1:00 works best for us. Hopefully you are available then also. In the meantime, we have some preliminary thoughts on your COC submission.

There is a fundamental disconnect here, at least concerning contaminants on Chemetco property. The commitment is to clean up any problem a risk analysis finds, regardless of the source. Why are we even talking about limiting the analysis for this area to the 10 inch pipe discharge?

As I read your submission concerning COCs, a contaminant needs to fail three tests to become a COC. If one test is passed it is screened out of the analysis. Where does the 3 strikes test come from? What is its basis and where has it been used before? I don't see how it complies with the COC definition cited, "any contaminant that is expected to be present.... This language does not allow for the screening of contaminants based on regulatory and non regulatory numeric standards. The actual risk analysis is designed to do this. The inquiry being proposed here appears to be backwards and results oriented.

Concerning dioxin, your analysis must take into account that U.S. EPA sampling in the polishing pits at Chemetco found dioxin concentrations at a TEF of 3.4 ppb. Also, U.S.EPA in a recently promulgated regulation found cooper smelters as a class to be a major contributor of dioxin. Forget what a MSDS says. Finally, there is a preliminary remediation goal (PRG) used concerning dioxin in soils developed by U.S.EPA Region 9. Sample results on Chemetco's property are in excess of the remediation goal set for dioxin (27 PPB). Below are referenced to web sites where additional information on this can be found. Please forward this information to your consultants.

For our part, we will review the RODs you cite if you provide to us the names of the sites.

The website for the Region 9 PRGs is
http://www.epa.gov/region09/waste/sfund/prg/index.htm

The website for the Dioxin Inventory of the United States is:
http://www.epa.gov/ncea/pdfs/dioxin/dioxin.pdf

We look forward to a productive conference call with you next Wednesday.

JAMES MORGAN
<JMORGAN@atg.state.il.us>

10/21/02 04:52 PM

To: adoyle@enrd.usdoj.gov, gsukys@enrd.usdoj.gov, EPA4343@epa.state.il.us, EPA4449.PO_BOL.DO_BOL@epa.state.il.us, EPA8814.EPAPO1.EPADO1@epa.state.il.us, Mary Andrews/DC/USEPA/US@EPA, Thomas Martin/R5/USEPA/US@EPA, Robert Smith/R5/USEPA/US@EPA, Jeffery Trevino/R5/USEPA/US@EPA
cc:
Subject: Re: Slag issue

** Reply Requested When Convenient **

I got the proposal. Does EOI have it in for Hastie Mining? Are they looking to patent this process guaranteed to create multiple CERCLA sites? I want to know what air permits and fugitive emission control plans, if any, Hastie does have. What will be done to control emissions from the open air piles at Hastie and the tarped truck on the return trip? What about a spill plan for either leg of the trip? Is EOI looking to get disqualified for incompetence so they get away from this site?

>>> "Chris Cahnovsky" <EPA4343@epa.state.il.us> 10/21/02 04:13PM >>>
All,

I just received a letter from Environmental Operations about how they intend to move and treat the slag to Hastie Mining in Rosiclair, Illinois.

If you would like a copy, please foward me your fax number and I will get it to you before the phone call tomorrow.

Thanks,

Chris

Tom Martin
Associate Regional Counsel
U.S.EPA, Region 5
312-886-4272

Jeffery Trevino

10/16/02 01:31 PM

To: JAMES MORGAN <JMORGAN@atg.state.il.us>
cc: ADoyle@ENRD.USDOJ.GOV, Chris.Perzan@epa.state.il.us, GSukys@ENRD.USDOJ.GOV, Mary Andrews/DC/USEPA/US@EPA, Thomas Martin/R5/USEPA/US@EPA
Subject: Re: Chemetco -- Sept 21 letter from Livingston

The 18th or 22nd would work for me.
JAMES MORGAN <JMORGAN@atg.state.il.us>

JAMES MORGAN <JMORGAN@atg.state.il.us>

10/16/02 12:32 PM

To: ADoyle@ENRD.USDOJ.GOV, GSukys@ENRD.USDOJ.GOV, Chris.Perzan@epa.state.il.us, Mary Andrews/DC/USEPA/US@EPA, Thomas Martin/R5/USEPA/US@EPA, Jeffery Trevino/R5/USEPA/US@EPA
cc:
Subject: Re: Chemetco -- Sept 21 letter from Livingston

** Reply Requested When Convenient **

I think a conference call would be good. How about the afternoon of the 18th or the morning of the 21st or 22nd?

>>> <Andrews.Mary@epamail.epa.gov> 10/16/02 11:36AM >>>
I finally reviewed the material submitted on behalf of the trustee that analyzes the various options for processing slag. Do we have a plan for responding to this letter? Or do we need to convene a conference call to discuss among ourselves?

MSA

Tom Martin
Associate Regional Counsel
U.S.EPA, Region 5
312-886-4272

APPENDIX D: OUTLINE OF ZINC OXIDE RELEASE AREA WORK TO BE PERFORMED

I. Introduction

This outline has been prepared to generally reference activities necessary to assess and address the extent of human health and environmental risks, if any, posed by the chemicals of concern (COCs) present in Long Lake surface water and sediments both on the Chemetco Property (the Site) and upgradient and downgradient of the Site. The downgradient extent of evaluation will be to I-270. Other specific requirements are further defined in the Partial Consent Decree.

II. Previous Study

The Illinois Environmental Protection Agency (Illinois EPA) has conducted a limited initial sampling and analysis program to evaluate the impact of Chemetco's discharge on Long Lake.[1] Analytical results from the previous sampling are presented in Table 1.

III. Selected Chemicals of Concern

Based on existing information and analytical results and interpretations, boron, cadmium, copper, fluoride, iron and TDS are designated COCs for surface water. Antimony, Arsenic, Barium Beryllium, Boron, Cadmium, Chloride, Chromium, Cobalt, Copper, Fluoride, Iron, Lead, Mercury, Nickel, Selenium, Silver, Sulfate, Tin Vanadium and Zinc are designated COC for sediments.

IV. Additional Sampling of Long Lake Surface Water and Sediments

Additional sampling of Long Lake surface water and sediments is proposed to characterize the extent of contamination. Fifteen sample locations have been proposed. Sample locations are proposed to show the extent of contamination as a function of distance from the Chemetco Property and potential source areas. The proposed sampling locations are presented in Appendix E. The exact location of the samples taken will be determined by field personnel to achieve the purpose of the investigation based on site specific conditions present at the time of the sampling event.

Surface water samples will be analyzed for the COCs (boron, cadmium, copper, fluoride, iron, and TDS) and conventional water quality parameters including pH and hardness. Surface water analyses will be conducted on both filtered and unfiltered samples. Sediment samples will be analyzed for the COCs referenced above and listed in Appendix C. Surface water and sediment samples will be conducted from mid-channel. Sediment samples will be collected from 0 to 10 inches beneath the surface of the lake bed. All field activities will be conducted using Illinois EPA approved sampling and analytical methods in accordance with a site-specific sampling and analysis plan (SAP) required by the Partial Consent Decree. The U.S. EPA and Illinois EPA reserve the right to require Chemetco to perform additional sampling if the initial

sampling indicates that additional samples are necessary to adequately determine the nature and extent of contamination.

V. Risk Assessment: Human Health and Ecological

Based on the analytical results, human health and ecological risk assessments will be performed in accordance with the Risk Assessment Approach presented in Appendix F. A report summarizing the Human Health and Ecological Risk Assessment will be prepared in accordance with the Risk Assessment Work Plan required by the Partial Consent Decree.

VI. Remedy Selection

The results of the risk assessment will be evaluated per the terms of the Partial Consent Decree to determine if remedial activities are necessary. If remedial actions are necessary, a Cleanup Plan will be prepared and implemented per the terms of the Partial Consent Decree.

[1] Cahnovsky, Chris, IEPA, June 1999. *Final Sampling and Analysis Report, Long Lake – Mitchel, Illinois.*

Jeffery Trevino
10/09/02 01:42 PM

To: Thomas Martin/R5/USEPA/US@EPA, Robert Smith/R5/USEPA/US@EPA
cc:
Subject: Bankruptcy Trustee Proposals for slag at the former Chemetco, Inc.

Tom and Robert:

At your request, here are my comments. Thank you.

Jeffery.

----- Forwarded by Jeffery Trevino/R5/USEPA/US on 10/09/02 01:44 PM -----

Jeffery Trevino
10/03/02 10:28 AM

To: Thomas Martin/R5/USEPA/US@EPA, andrew.doyle@usdoj.gov, greg.sukys@usdoj.gov
cc:
Subject: Bankruptcy Trustee Proposals for slag at the former Chemetco, Inc.

Tom, Andy, and Greg:

After reviewing the recent documents I received from Jim Morgan regarding proposals by the Bankruptcy Trustee for the slag at the former Chemecto, Inc., I would like to offer to you the following comments.

1. In general, I still believe the use of the lead containing slag for product is not a good idea, as evidenced by the IEPA Letter, dated March 29, 1995, from Harry A. Chappel, P.E. to John Washburn, IDOT. While the use of the slag for road product (asphalt additive, roadbed material, aggregate for concrete for road, BUT not as exposed sloping material) may be negotiable, I believe any use of the slag for a household product (pigment in ceramic tile, roofing shingles) is unacceptable, particularly in light of our Clean Air Act Initative to get lead paint out of homes. The bottom line is we believe the wearing (peeling, chipping, cracking) of products with lead, produces lead dust which is harmful to human health, particuarly children, and the environment. Ceramic tiles and roofing shingles with lead, will wear down in or on homes, emit lead dust, and harm human health and the environment.

2. Jim Herak, Stein Steel Mill Services, Inc., states in his memorandum, dated August 29, 2002, p.1, Item 3. "The environmental status of the material will ultimately govern its acceptance as commercial product; that is, a manufacturer, processor, builder or IDOT will nout use the product in its course of business if there is even the slightest possiblity of environmental liability or exposure down the road." Clearly we will not be able to give any such person any shield from potential liability. This is critical. After all, later in the memorandum, on p. 4, par. 6, he writes "[As mentioned earlier, prospective customers for any or all of these applications require unconditional exemption from environmental liability/exposure; this is an imperative which the Trustee must provide.

3. Finally, does any of this slag talk include the slag which is the parking lot filling the wetlands?

Thank you.

Jeffery.

Tom Martin
Associate Regional Counsel
U.S.EPA, Region 5
312-886-4272

LIVINGSTON LAW OFFICE

6001 Old Collinsville Road
Building 4 - Suite B
Fairview Heights, IL 62208

(618) 628-7700
Fax (618) 628-7710
pslelaw@apci.net

PENNI S. LIVINGSTON
Attorney at Law

September 21, 2002

James L. Morgan
Attorney General's Office
500 S. 2nd St.
Springfield, Il. 62706.

RE: Slag Processing at Former Chemetco Site

Dear Jim:

It is my understanding that when I send you correspondence and documents, you will forward copies of everything to all of the other government people involved, federal and state. I appreciate that very much.

Enclosed is a copy of three memos that address the issues of processing slag at the former Chemetco facility. Two of these memos are from the only two qualified bidders we have identified and pre-qualified. The other memo is from our consultant, Dr. Ron Yarbrough. Each memo is an attempt to answer the questions from Mary Andrews USEPA Memo. We feel quite hopeful that everyone will see the resource recovery and recycling goals of RCRA will be achieved in the processing of the slag.

We have yet to get bids from these two qualified bidders as we would first like to identify the end uses that are acceptable under RCRA in the eyes of the government in our concerted effort to not only meet the goals of RCRA but to clean up this site by removing these materials. Because this process has been on-going for sometime, the bidders are anxious to know where they stand. Furthermore, we need the money that the processing will bring to pay off the creditors and to use in performing other needed environmental remediation at the site (remediation that has still not been identified and prioritized by the government).

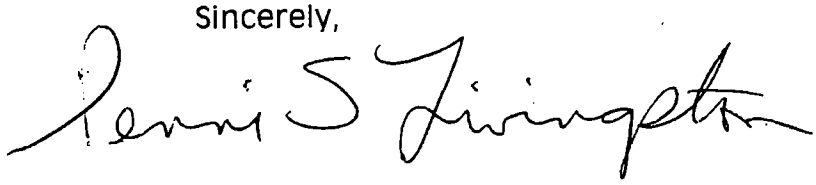
We would like to move on this as quickly as possible. After obtaining favorable reception from the government on our end uses, we still have the process of bidding, notice to all creditors, getting Bankruptcy Court approval, and negotiating and drafting contract terms that insure this slag processing is performed properly and in accordance with the law. I would ask that the government review the bidder and consultant memos and give us their comments and positions so that we can get a proper bid document prepared. The bidders need to know the end use to give us an accurate bid proposal.

To this end, I hope you all can complete your review as soon as possible but surely within 30 days. We have been talk about this for some time. No uses listed

are new to the discussion and you have had two of these documents for a few weeks through Tom Martin. It would help us a great deal if the review could be done in this 30 days. Seasons are changing. Please let us know what end uses you believe are appropriate under RCRA. Thank you.

Please call me with any questions or comments or if you need additional information. If you do not feel that 30 days is sufficient to review these materials and make a determination, please let me know that as well. Thanks to all the government people for all of your efforts on this matter of great importance for the environment and for justice to the creditors. The environment and this site specifically will be better because we all are working on this matter.

Sincerely,



Penni S. Livingston

With the foregoing observations in mind, the potential uses [illegible] will be addressed.

SEP-08-02 10:48 FROM- T-338 P.002/006 F-745

STEIN STEEL MILL SERVICES, INC.

AUG 29 [illegible]
BK 01-34066

8.27.02

To: Laura K. Grandy, Trustee of Chemetco, Inc.

Fr: Jim Herak
Stein Steel Mill Services, Inc.

Re: Notice to Potential Slag Contractors/Purchasers, dated August 9, 2002.

In response to the Notice to Potential Slag Contractors/Purchasers, dated August 9, 2002, the following information is submitted.

Stein Steel Mill Services, Inc. has performed preliminary market analyses for commercial uses of the slag previously produced at the Chemetco smelter facility. The findings herein indicate actual, as well as potential, uses for the slag and in any case will be subject to further investigation and review before a course of action is taken.

The term "potential" is used to describe the various markets discussed for three reasons:

1. Actual prior use of the slag has been limited to roofing shingles and road building aggregate; both of these uses are currently suspended.

2. A commercial obstacle to the use of the material exists in that the amount of copper slag is finite ("a one time pile") and, as a result, potential customers will require an incentive to switch to copper slag from previous sources of material and then back to previous sources when the copper slag is depleted. There is no assurance that any other supply will exist in the future.

3. The environmental status of the material will ultimately govern its acceptance as commercial product; that is, a manufacturer, processor, builder or IDOT will not use the product in its course of business if there is even the slightest possibility of environmental liability or exposure down the road.

The required level of preparation of the slag for such an application would probably be ball or rod milling to reduce the slag to a powder, just as is portland cement.

Road Bed Material.

As an aggregate for road bed/embankment construction, Chemetco's slag has a history. It has been used by several local government units as base course in the construction of roads with excellent results. The slag was generally graded at -1 ½" and was used as a substitute for limestone chiefly because of its hardness and durability.

In another local application, the slag was used as an embankment stabilizer for an approach to a bridge abutment; the material was graded at 2" x 3" and placed in this application over 15 years ago; it has performed in an excellent manner.

Preparation of the slag for this purpose would be conventional crushing and screening to specified gradations.

This application is especially pertinent, since its performance history is excellent and the preparation process of the material does not require rod or ball milling (which is expensive). Further, the tonnage which may be consumed could be considerable.

With the plans of IDOT and MODOT to construct a new bridge over the Mississippi River in the next 8 years and reroute Interstates 55, 70 and 64, it is not inconceivable that 300000 to 500000 tons of the slag could be used in slope stabilization, road bed stabilization and base course for road and ramp construction, should the respective DOT's elect to use the material.

In the interest of conserving natural resources (equivalent tonnage of trap rock) and the utilization of an industrial "by-product", the use of Chemetco slag in this application would be a "win-win" situation for all.

Aggregate for Concrete.

As a follow-on to previous aggregate discussions, this material can be used as either a fine (-3/8") or course (+3/8) aggregate in the production of ready mix concrete.

The material's cubical angularity and soundness provides a good substitute for limestone.

Roofing Granules.

The roofing granule application has history in that several hundred thousand tons of granules were shipped to a roofing manufacturer for use as backing to asphalt shingles.

This market can be recovered and roofing companies would typically commit to term contract purchases of the granules if the source is stable and the product is in gradation specification.

The gradations required can be achieved through mechanical secondary crushing and screening.

Preliminary market research indicates that there are 33 companies who manufacture and produce "asphalt felts and coatings" (SIC 2952).

Raw Material for the Manufacture of Portland Cement.

Chemetco's slag could be used as a raw material in the manufacture is portland cement.

Cement plants have historically used iron and steel slag in a marginal amount to increase their production of clinker. In addition, copper slag contains calcium, aluminum, silicon and ferrous oxides, all elements required in the manufacture of cement.

Cement plants generally accept such materials at a gradation of -1"; they would, however, accept fine gradations (-1/8") since the amount of grinding by the cement plant would be minimal.

One cement plant committed to this material could absorb and use 50-60000 tons of material per year.

It should be noted, however, that cement plants generally use such marginal materials when production demands are high; they will cut back use in economic downturns.

In summary, there appear to be a variety of markets available for the use of the copper slag currently on the former Chemetco site.

In all of the applications cited, the material would be used as raw material fed into a manufacturing or production process, and as such would not constitute disposal of the material.

The preparation of the material for market ranges from straight forward primary crushing and screening to complicated secondary rod and/or ball milling for the fine grade applications.

None of these applications require chemical processing which would in any way change the chemical composition of the material.

Water, however, will be required for dust suppression during crushing/screening operations. A provision by the Trustee for the detention of this water, as well as storm water, will be required.

As mention earlier, prospective customers for any or all of these applications require unconditional exemption from environmental liability/exposure; this is an imperative which the Trustee must provide. Neither a potential customer or slag processor will assume any enviromental exposure in situations such as this.

In light of the foregoing discussion, it would be appropriate to schedule a meeting in the next few weeks with the Trustee/Staff and Stein representatives to assess the environmental status of the slag and address the feasibility, if any, to the processing of the slag for beneficial use as an aggregate or input raw material.

We look forward to your favorable and expeditious reply.

ATTENDANCE RECORD

Date 8/6/02

Subject Chemetco

NAME	AFFILIATION	TELEPHONE
Chris Cahnovsky	IEPA / Collinsville	618/346-5120
Chris Pinzael	IEPA / DLC	217 782-5544
Jim Morgan	IAGO	217-524-7506
KEVIN LESKO	IEPA / PERMIT	217-524-3271
Sandra Bron	IEPA / Superfund	217/557-3199
ERIC WATT	Laura Grandy Trustee Employe	618 254-4381 ex230
Ron Yarnevich	Bankruptcy Court	618-254-4381
Pam Livingston	Atty for Trustee	618-628-7700
LAURA K. GRANDY	TRUSTEE	618-234-9800
Thomas Martin	USEPA-ORC Region 5	312-886-4273
Erin Rednour	IEPA - Superfund	217-785-8725
On phone:		
Jeff Trevino	USEPA - ORC	312 886-6729
Andy Doyle	USDOJ	202 514-4427
Greg Sukys	USDOJ	202 514-2068
Mary Andrews	USEPA - HQ	202

http://www.epa.gov/ncea/pdfs/dioxin/dioxin%20questions%20and%20answers.pdf

[4] According to Tom Hornshaw of IEPA (telephone communication April 2, 2001), there are currently no dioxin

May 14, 2001

George von Stamwitz
Armstrong, Teasdale, Schlafly & Davis
One Metropolitan Square, Suite 2600
St. Louis, MO 63102-2740

Re: United States and Illinois v. Chemetco,

Dear George:

We have reviewed Chemetco's request to forego sampling for dioxin in the Long Lake investigation and risk assessment. Although we cannot eliminate dioxin as a contaminant of concern at this stage, Chemetco will not be required to sample for dioxin during these phases. Split samples or other samples taken by the governments may be analyzed for dioxin. You have agreed that until there is definitive data demonstrating the absence of dioxin above levels of concern, the investigation and risk assessment may be deemed inadequate. Furthermore, any disposal of contamination found in Long Lake will require testing for dioxin to satisfy the requirements of the disposal facility.

We also expect a response from Chemetco on the remainder of the COC list. In particular, we would like to know why the soil ingestion standards are being used rather than the more protective soil in contact with groundwater standards. The latter standard seems better suited for this situation - contaminated sediments in contact with standing/flowing water.

If you have any questions, please call me at 217-524-7506.

Very truly yours,

James L. Morgan
Senior Assistant Attorney General

JM:jm
pc: State Contacts
Federal contacts

Juan - Need to send these letters early next week. Can you confirm addresses and get contact names. Any comments?

— Ken

DE-9J

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Chemetco, Inc.
3754 Chemetco Lane
Hartford, Illinois 62048

RE: RCRA Corrective Action Evaluations in Response to Government Performance and Results Act
Chemetco, Inc., EPA I.D. No.: ILD 048 843 809

Dear Mr.(Ms.):

Your facility is subject to Section 3008(h) of the Resource Conservation and Recovery Act (RCRA). Corrective action may be required at your facility to address releases of hazardous wastes and/or constituents from solid waste management units (SWMUs). This letter is to inform you that the Chemetco facility located in Hartford, Illinois has been scheduled for evaluation by representatives from the United States Environmental Protection Agency (U.S. EPA), Region 5.

This effort is being initiated in order to ensure that your facility does not pose an environmental hazard to human health or the environment. Your facility has been included as a part of Region 5's Government Performance and Results Act (GPRA) Baseline of RCRA corrective action facilities. The Baseline list is made up of those facilities which are the highest corrective action priorities. Your facility will be evaluated in order to establish an accurate understanding of its environmental status. That status information will serve as a part of our determination of the next steps we must take.

Because Chemetco, Inc. is a GPRA Baseline facility for which RCRA corrective action has not been initiated, the U.S. EPA, Region 5 will conduct an evaluation of U.S. EPA and State RCRA files and will perform a visual site inspection of your facility. The site inspection of your facility is being scheduled November 2 and 3, 1999. Mr. Juan Thomas will be contacting you in order to schedule this site visit. Your cooperation and assistance will enable U.S. EPA representatives to establish the best possible

understanding of the environmental condition of your facility.

Please contact me at (312) 886-7566 if you have any questions.

Sincerely,

Kenneth S. Bardo
Corrective Action Section
Enforcement and Compliance Assurance Branch

cc: IEPA Corrective Action Section

CHEMETCO (ILD 048 843 809)

Chemetco operates a secondary copper smelter near the intersection of Highways 3 and 203 in Hartford, Illinois. Facility processes include smelting, refining, and slag treatment. Wastes generated by the facility include slag from the smelting and treatment operations, and zinc oxide sludge from the foundry flue gas scrubber system. Analyses of zinc oxide sludge and slag samples have indicated EP Toxic levels of lead and cadmium. The surrounding area is mostly farmland, and at least one residence exists within 1/4 mile of the facility.

The groundwater route score was based on contamination involving heavy metals. The quantity of waste is unknown but it is likely to be large because of the size of the zinc oxide pits, slag piles, and settling impoundments. It was assumed that the groundwater is possibly used as drinking water within 2 to 3 miles of the facility.

The surface water route score was based on an observed release. Evidence of releases of hazardous wastes to nearby roads, agricultural fields, and surface water bodies has been documented. The surface water bodies include Long Lake and the Cahokia Drainage Canal. The canal is within 1/2 mile of the facility and is used for recreational purposes. The quantity of waste potentially affecting the surface water bodies is unknown, but it is assumed to be small because of the distance to the canal. No information was available on sensitive environments within 2 miles of the facility.

There has been no observed, unpermitted, ongoing release scored for the air route. Contaminants can migrate to the air, and containment is poor because of the surface soil contamination.

The on-site soil route score was based on an observed release to the surface soils. Liquid wastes from the acid pit and acid recovery ditch have damaged vegetation and discolored the soil. Accessibility is unlimited because contamination has occurred beyond the fenced-in area. Liquid from old zinc oxide pits that was pumped into the canal contained lead and cadmium. Runoff from the canal drained across Chemetco's property line and into adjacent fields. No sensitive environments exist at the facility.

Reference:

EPA. 1986. RFA Report for the Chemitco Facility in Hartford, Illinois.

RCRA PRIORITIZATION SYSTEM SCORING SUMMARY

FOR

CHEMETCO

EPA SITE NUMBER: ILD 048843809

HARTFORD, IL

SCORED BY: R. GEIGER

OF PRC EMI

ON 07/26/91

GROUNDWATER SCORE	:	35.08
SURFACE WATER SCORE:		49.75
AIR ROUTE SCORE	:	9.49
ONSITE SCORE	:	85.71
---	---	---
MIGRATION SCORE	:	52.78

WS-1 GROUNDWATER ROUTE

IS THERE AN OBSERVED RELEASE? Y

ROUTE CHARACTERISTICS

DEPTH TO AQUIFER (FT.) : NA

NET PRECIPITATION (IN.) : NA

PHYSICAL STATE: NA

CONTAINMENT:

WASTE CHARACTERISTICS

CHEMICAL NAME OR WASTE CODE NUMBER: CADMIUM, METALS

TOXICITY/PERSISTANCE VALUE: 18

QUANTITY KNOWN? NO

CUBIC YARDS OR TONS: 0
DRUMS : 0

AMOUNT IS LIKELY TO BE LARGE

TARGETS

GROUNDWATER USE: POSSIBLE DRINKING WATER

DISTANCE TO WELL (MILES): 2.5

WS-2 SURFACE WATER ROUTE

RELEASES

IS THERE AN OBSERVED RELEASE? Y

IS THERE A PERMITTED OUTFALL?

HAVE THERE BEEN PERMIT VIOLATIONS?

ROUTE CHARACTERISTICS

FACILITY LOCATION:

24-HOUR RAINFALL: NA

DISTANCE TO SURFACE WATER (MILES): NA

PHYSICAL STATE: NA

CONTAINMENT: NA

WASTE CHARACTERISTICS

CHEMICAL NAME OR WASTE CODE NUMBER: CADMIUM

TOXICITY/PERSISTANCE VALUE: 18

QUANTITY KNOWN? NO

CUBIC YARDS OR TONS	:	0
DRUMS	:	0

AMOUNT IS LIKELY TO BE SMALL

TARGETS

SURFACE WATER USE: POSSIBLE DRINKING WATER OR RECREATION

DISTANCE TO INTAKE OR CONTACT POINT (MILES): 0.4

DISTANCE TO SENSITIVE ENVIRONMENT (MILES): 3.0

EPA ID NO. : ILD 048843809
CHEMETCO

WS-3 AIR ROUTE

RELEASES

IS THERE AN OBSERVED, UNPERMITTED, ON-GOING RELEASE? N

DOES THE FACILITY HAVE AN AIR OPERATING PERMIT(S)? N

HAVE THERE BEEN ANY PERMIT VIOLATIONS OR ODOR COMPLAINTS BY RESIDENTS? N

CAN CONTAMINANTS MIGRATE INTO AIR? Y

CONTAINMENT: POOR

WASTE CHARACTERISTICS

CHEMICAL NAME OR WASTE CODE NUMBER: LEAD

TOXICITY/PERSISTANCE VALUE: 3

QUANTITY KNOWN? NO

CUBIC YARDS OR TONS: 0
DRUMS : 0

AMOUNT IS LIKELY TO BE SMALL

TARGETS

POPULATION: RESIDENCES ARE LOCATED WITHIN FOUR MILES

DISTANCE TO SENSITIVE ENVIRONMENT (MILES): 3.0

EPA ID NO. : ILD 048843809
CHEMETCO

WS-4 ON SITE CONTAMINATION

ACCESS TO SITE: UNLIMITED ACCESS

IS THERE AN OBSERVED SURFACE SOIL CONTAMINATION? Y

CONTAINMENT: POOR

WASTE CHARACTERISTICS

CHEMICAL NAME OR WASTE CODE NUMBER: CADMIUM

TOXICITY/PERSISTANCE VALUE: 3

TARGETS

DISTANCE TO RESIDENTIAL AREAS (MILES): .00

IS THERE AN ON-SITE SENSITIVE ENVIRONMENT: N

TABLE 1

SUMMARY OF PRIORITIZATION SCORES FOR RCRA TREATMENT, STORAGE, AND DISPOSAL FACILITIES
(NUMERICAL ORDER BY REGIONAL RANK)

RANK	SITE NAME AND EPA ID NO.	LOCATION CITY AND STATE	ROUTES M	GW	SW	AIR	SITE	SCORES DATES	PRIORITY	COMMENTS
157	REILLY INDUSTRIES, INC. IND 000807107	INDIANAPOLIS, IN	52.83	76.92*	34.04*	47.44*	42.86*	08/22/91	H	
158	CHEMETCO ILD 048843809	HARTFORD, IL	52.78	35.08*	49.75*	9.49	85.71*	07/26/91	H	
158	PPG INDUSTRIES, INC. MID 048788749	ADRIAN, MI	52.78	95.56	30.23	25.30	21.43*	12/23/91	H	aka HUGHES CHEMICAL CO.
160	COPLAY CEMENT COMPANY IND 005081542	LOGANSPORT, IN	52.74	88.46*	49.75	19.19	21.43*	08/28/91	H	aka ESSROC MATERIALS
161	ALLIANCE TUBULAR PRODUCTS CO. OHD 004469375	ALLIANCE, OH	52.58	70.17*	73.08	18.30	21.43*	03/17/93	H	aka BABCOCK & WILCOX
161	U.S. ARMY, JEFFERSON PROVING IN5 210020454	MADISON, IN	52.58	69.04*	68.41	18.30	35.71*	06/28/93	H	
163	HUKILL CHEMICAL CORPORATION OHD 001926740	BEDFORD, OH	52.51	84.62*	57.61*	9.49	21.43*	12/27/93	H	
164	GMC AC ROCHESTER-DORT HIGHWAY MID 005356647	FLINT, MI	52.47	84.62*	56.33	14.76	21.43*	06/23/93	H	
164	U.S. ARMY - JAAP IL7 213820460	JOLIET, IL	52.47	82.93*	58.35*	24.84	10.71*	08/14/91	H	
166	S.C. JOHNSON AND SON, INC. WID 006091425	STURTEVANT, WI	52.45	84.62*	57.61*	8.12	21.43*	03/18/94	H	
167	FOUR COUNTY LANDFILL IND 000780544	FULTON COUNTY, IN	52.41	100.00*	25.91	17.82	0.00	08/30/91	H	CERCLA SITE
168	EAGLEBROOK OF OHIO OHD 000724088	CLEVELAND, OH	52.36	49.30	33.17	9.49	85.71*	08/29/91	H	
169	MINNESOTA AIR NATIONAL GUARD MND 000773341	DULUTH, MN	52.31	66.04*	68.41*	8.24	42.86*	08/26/91	H	aka DULUTH AIR NATIONAL GUARD

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* AN OBSERVED RELEASE WAS SCORED FOR THIS ROUTE.

M - MIGRATION GW - GROUND WATER SW - SURFACE WATER AIR - AIR SITE - ON SITE

PRIORITY:

L - LOW M - MEDIUM H - HIGH

9-22-99

Site visits: Chemetco

+

Solutia/Monsanto

with Ken Bardo, to be done in October, however complete TA and make travel arrangements during September per George Hamper.

What to do

1. Review RCRA, TSDF Corrective Action Authorization, Attachment (Handout) 1 ... Cumulative Scoring For 1,696 facilities to find out how both facilities ranked
2. Then look at Narratives and Scoring Sheets of RCRA TSDF based on ranking. (Note, the references for items 1 and 2 are located in the bookcase across from Lisa Capps).
3. Look at "IRIS info" (on computer desktop) and see what has been done at these sites, so as to know what info should be pulled from the Region 5 Records center
4. Go to Region 5 Records center and complete a RCRA Records document request for all items under D.1. (Corrective Action/Facility Assessment)
5. Review all above info and surmise what is still existing at the site vs. what has

been done and try to approximate time it would take to conduct a site visit, where any outstanding conditions identified during the records review at the office can be compared to observable conditions existing at the site

6. Complete JA authorization, locate maps and see where the 2 facilities are located in relation to each other

7. Read over 2 handouts provided

ENVIRON

Date: May 3, 2001

To: Heather Young, Chemetco

From: Roy Ball
Barbara Coughlin

Re: Expanded List of Constituents for Selected Samples and Appropriate Remediation Objectives

List of Constituents:
In response to concerns raised by the regulatory agencies, an expanded list of constituents will be analyzed for on twenty percent of the samples collected during implementation of the Long Lake Scope of Work (SOW). Based on the sample location list presented in the Long Lake SOW, we propose the expanded analysis list for a background sample, a sample near the source area, and a sample downgradient of the source area. Proposed sample locations and associated analysis lists are presented in Table 1. The primary list of constituents to be analyzed is presented in Table 2. The expanded list of constituents to be analyzed is presented in Table 3.

Tier 1 Soil Remediation Objectives:
In our March 5, 2001 memo, we proposed comparing the confirmation samples from Containment Areas #1 – 4 to the Illinois "Tiered Approach to Corrective Action Objectives" (TACO, 35 Illinois Administrative Code (IAC) 742) for Residential Tier 1 soil remediation objectives (SROs) for the soil ingestion and inhalation pathway. In a subsequent memo, we considered the soil ingestion exposure route, soil inhalation exposure route, and the soil component of the groundwater ingestion route (ENVIRON memo to Heather Young, dated April 10, 2001). Data for total metals and selected anions, toxicity characteristic leaching procedure (TCLP) metals and anions, and synthetic precipitation leaching procedure (SPLP) metals and anions were compared to the appropriate residential Tier 1 soil remediation objectives (SROs). The total metals and total anions data did not exceed any of the soil ingestion and inhalation SROs. Total, TCLP, and SPLP metals and anions data were compared to the appropriate soil component of groundwater ingestion route SROs (35 IAC 742 Appendix B: Tables A and D). Cadmium, fluoride, and iron exceeded their respective SROs for the soil component of the groundwater ingestion route.

Results of recent monitoring well installation indicate that there is a confining clay layer at least 20 feet thick beneath the containment areas. No shallow groundwater was encountered during subsurface investigation. These results confirm that the soil component of the groundwater ingestion route is not a viable pathway for this area.

Table 1: Proposed Sample Locations and Analysis List Selection

Sample ID	Sample Location	Analysis List	Notes
1	Culvert entrance, West side of Rte 3	Primary List	Background sample
2	Culvert exit, East side of Rte 3, intake of railway drainage, inside pipe	Expanded List	Background sample
3	Between railway easement and Long Lake, east side of railway culvert	Primary List	Background sample
4	Between parking lot and containment area	Primary List	On Site sample
5	Downstream of containment area and eastern property line	Expanded List	On Site sample
6	Upstream of Surface Water discharge area (former NPDES #002)	Primary List	On Site sample
7	Downstream of Surface Water discharge area (former NPDES #002)	Primary List	On Site sample
8	Eastern Property Line	Primary List	On Site sample
9	Drainage ditch near Property Line	Primary List	Downgradient sample
10	Downgradient of drainage ditch (near IEPA sample X102)	Primary List	Downgradient sample
11	Between IEPA sample locations X103 and X105	Expanded List	Downgradient sample
12	Upgradient of slag road	Primary List	Downgradient sample
13	Downgradient of slag road	Primary List	Downgradient sample
14	Franko Lane	Primary List	Downgradient sample
15	North side of I-270 Levee	Primary List	Downgradient sample

Table 2: Primary List of Constituents.

Soil/Sediments:	Surface Water:
Arsenic	Cadmium
Cadmium	Copper
Copper	Fluoride
Fluoride	
Iron	
Lead	
Nickel	
Zinc	

Table 3: Expanded List of Constituents.

Soil/Sediments and Surface Water:
Antimony
Arsenic
Barium
Beryllium
Boron
Cadmium
Chloride
Chromium
Cobalt
Copper
Fluoride
Iron
Lead
Mercury
Nickel
Selenium
Silver
Sulfate
Tin
Vanadium
Zinc

George M. von Stamwitz

ARMSTRONG TEASDALE LLP

MISSOURI | KANSAS | ILLINOIS | WASHINGTON, DC | SHANGHAI | SYDNEY

ATTORNEYS AT LAW

May 7, 2001

VIA FAX

Mr. James Morgan
Assistant Attorney General
Environmental Bureau
500 South Second Street
Springfield, IL 62706

Re: Chemetco - Partial Consent Decree

Dear Jim:

Thank you for your letter of April 20, 2001. I am attaching Chemetco's new proposed COC list which expands the list for selected samples. In the submittal Environ also responds to your inquiry regarding the utilization of standards.

Regarding dioxin, Chemetco appreciates that EPA/IEPA may take dioxin samples. Chemetco understands that EPA/IEPA will evaluate the deliverables due under the Partial Consent Decree in light of any data generated. We further recognize that any dioxin samples taken by EPA/IEPA could impact the evaluation by a disposal facility if soils/sediments are found to be actionable and excavation is deemed the appropriate remedy.

Please give me a call to discuss finalization of the language in the Partial Consent Decree.

Best regards.

Very truly yours,

George M. von Stamwitz

GMS/rmh
cc: Tom Martin (w/enc.) (via fax)
Greg Sukys (w/enc.) (via fax)
Roy Ball
Heather Young

Date: April 10, 2001

To: Heather Young, Chemetco

From: Roy Ball
Barbara Coughlin

Re: Contaminants of Concern, Chemetco Facility

The contaminants of concern (COCs) for the Zinc Oxide Release Area (ZORA) and associated areas of Long Lake should be consistent with the definition "Contaminant of Concern" as defined in the Illinois "Tiered Approach to Corrective Action Objectives" (TACO, 35 Illinois Administrative Code (IAC) 742):

> *"any contaminant that is expected to be present at the site based upon past and current land uses and associated releases that are known to the person conducting a remediation based upon reasonable inquiry" (35 IAC 742.200).*

Tom - I would call the proposed COCs selection process grossly inadequate and not consistent with the definition in the rules. The definition does not include a constituent by basis of concentration but solely on information gathered through "reasonable inquiry" that concludes that the contaminate is "expected to be present".

Chemetco's whole approach to risk based remediation is backwards. Risk approach only applies to clean-up levels once you know what is at site. Risk approach to remediation does not include deciding what you are looking for on site. Corrective action or a remediation process in general starts with general sampling in areas "expected" to have been contaminated with contaminates suspected to be "present" (found through historic materials used, wastes generated, existing data etc). Usually constituents are only eliminated when those suspect areas have previously been tested for that constituent and it was not found above background levels. Once this initial data is generated, the areas of investigation and list of analytes can often be scaled back if the contaminates are not found above background in the some areas. Only after you know the extent and degree of contamination can one assess risk. The fact that a constituent is know to exist above background, should put a constituent on the list until additional data shows that it is not is the area investigated.

COCs are proposed herein based on: 1) presence of a given chemical constituent in the zinc oxide source material; 2) presence of zinc oxide source material constituents in the given medium; and 3) exceedance of the appropriate TACO Tier I or General Use Water Quality Standards (35 IAC 302.208). If all three criteria are met, the constituent is retained as a COC. **I thought that Chemetco had agreed to cleanup everything that was found to be above cleanup levels that is on-site. Here again they are trying to link COC's only to stuff in zinc oxide. I guess they are still hanging on to a future defense that the lead, cad. Whatever is not from zinc oxide therefor not covered by the order, or approved assessments etc.**

Soil/Sediment COCs:

<u>Inorganic Soil/Sediment COCs - Ingestion and Inhalation Pathway:</u>

Chemicals characteristic of the zinc oxide material that were detected in Containment Areas # 1 – 4 and/or Long Lake were compared to the TACO Tier I residential soil remediation objectives (SROs) for soil ingestion & inhalation pathways (See Table 1). Based on this analysis, arsenic, cadmium, lead, and vanadium are retained as soil COCs for the ZORA. However, when sample data from individual borings are averaged as allowed in 35 IAC 742.225, vanadium does not exceed the Tier I SRO for this pathway. Therefore, vanadium is not retained a soil COC for this pathway. The underlying data used in the comparison to Tier I values are presented in Attachment 1. The zinc oxide material profile and analytical data are presented in Attachment 2.

Inorganic Soil/Sediment COCs - Soil Component of the Groundwater Ingestion Exposure Pathway:

The soil component of the groundwater ingestion exposure pathway has been evaluated by a combination of three methods: comparison of toxicity characteristic leaching procedure (TCLP) or synthetic precipitation leaching procedure (SPLP) data to applicable groundwater criteria[1] and comparison of soil values to pH specific SROs. Possible exceedances of the SROs for the soil component of the groundwater ingestion exposure pathway were evaluated using the following procedure. For a given constituent in a given sample, the TCLP value, if available, was compared to the SRO for the soil component of the groundwater ingestion route values for Class II given in 35 IAC742 Appendix B: Table A. If the TCLP value exceeded the SRO or was not available, the SPLP value, if available, was then compared to the SRO. If the SPLP value exceeded the SRO or was not available, the soil concentration was compared to the pH specific SRO given in 35 IAC 742 Appendix B: Table D. Compliance with the SRO was achieved if any one of the three methods indicated that the measured value was less than the given SRO value. SROs are presented in Table 2.

Data used in the comparison to SROs are presented in Attachment 1. Based on the TCLP screen, arsenic, barium, chloride, cobalt, chromium, mercury, nickel, and selenium are not COCs for this pathway. There are no Class II groundwater SROs for silver, sulfate, tin, and vanadium. Thus silver, sulfate, tin, and vanadium are not considered to be COCs for this pathway. Lead fails the TCLP screen for two samples. However, SPLP data for these two samples are less than the SRO. Thus lead is not a COC for this pathway, assuming Class II groundwater.

Comparison of the data to the appropriate standards indicates that cadmium in one sample (LL8-6, failed all three screening methods), iron in one sample (LL2-6, only iron TCLP data available and there is no pH specific SRO for iron), and fluoride in 4 samples (LL2-6, LL6-6, LL7-6, and LL-8-6, failed TCLP and SPLP when SPLP data were available and there is no pH specific SRO for fluoride) exceed the appropriate standard. If the samples are averaged within borings, as allowed in 35 IAC 742.225c, fluoride only exceeds the appropriate standard in boring LL8. Cadmium and iron still exceed the standards. Therefore, cadmium, fluoride, and iron are added as COCs for this pathway.

Organic Soil/Sediment COCs:

Organic compounds are not expected to be present in the Zinc Oxide material based on the Material Characterization Sheet for Zinc Oxide (See Attachment 2). Chemetco has analyzed the Zinc Oxide material and has concluded, "organic compounds, semi-volatile organic compounds, and hexane are not present in the zinc oxide".[2] Therefore based on the definition of COC given above, there are no organic COCs for soils and sediments. **I don't know about this since I never looked at organics for the site. If we have organic is previous samples, they should be on the analyte list. We should definitely look for all PBTs that could reasonably be expected to be present.**

Combined List of Soil/Sediment COCs:
Based on the analysis provided above arsenic, cadmium, fluoride, iron, and lead are considered to be Soil/Sediment COCs. Previous analysis of sediments by IEPA indicated that copper, nickel, and zinc might be significant in Long Lake sediments. Therefore copper, nickel, and zinc will also be included as COCs.

Surface Water COCs:
Similar to the selection of soil and sediment COCs, surface water COCs were determined by comparing the concentrations of chemicals present in Long Lake surface water that are characteristic of the zinc oxide source material to the General Use Water Quality Standards (35 IAC 302.208) (See Table 3). Based on this analysis cadmium, copper, and fluoride are retained as surface water COCs for the ZORA. The Long Lake surface water data are presented in Attachment 3. **If some thing is a COC in sediment why wouldn't it be a COC in the water above those sediments.**

As noted above, organic compounds are not expected to be present in the Zinc Oxide material. Therefore based on the definition of COC given above, there are no organic COCs for surface water. **I thought they were going to clean up their site regardless of the source**

Dioxins:
As stated above, organic compounds are not constituents of the Zinc Oxide material. Therefore, dioxins (CDDs/CDFs) should not be considered as COCs for the ZORA.

Dioxins are prevalent in the environment, from combustion processes such as commercial or municipal waste incineration, burning of fuels, burning of household trash and during forest fires. Certain types of chemical manufacturing and chlorine bleaching of pulp and paper also create small quantities of dioxins. Dioxins may also be produced at very low levels by natural processes. Currently, the uncontrolled burning of residential waste and accidental fires at landfills are thought to be among the largest sources of dioxins to the environment in the United States.[3] **How about incinerating auto scrap like they do at Chemetco! I believe that dioxin is a common in wire insulation. Wire scrap would reasonably be expected to have dioxin combustion products.**

CDDs/CDFs were measured by Chemetco as part of the Containment Area cleanup and also by IEPA (see Tables 4 and 5). Toxicity equivalences (TEQs) calculated from the Chemetco ZORA samples (see Table 4) did not exceed 0.55 ppb. TEQs calculated for samples collected by IEPA from the Containment Area did not exceed 0.123 ppb. Therefore, even if there were an applicable standard for CDDs/CDFs[4], it is evident that the levels in Long Lake (that could only be less than the source area) would not be significant. **I'm not familiar with this data.**

Several Records of Decision (RODs) for sites where dioxins are present have been reviewed. In three of these RODs, the action level for dioxin cleanup was 20 ppb TEQ. For other NPL sites, the dioxin action level was 1 ppb TEQ. Dioxin levels at the Chemetco site are significantly lower than these action levels adopted at NPL sites.

ATTACHMENT 1

	UNITS	S1A	S1B	S2A	S2B	S3A	S3B	S4B	S5B	S6B	S7B	S8B
Arsenic	mg/kg	24.0	24.0	17.0	9.0	11.0	5.0	13.0	18.0	9.0	29.0	24.0
Barium	mg/kg	190	150	190	150	180	160	200	200	160	160	210
Cadmium	mg/kg	9.9	5.2	12.0	3.5	3.3	3.3	3.3	4.8	3.1	3.0	74.0
Chromium	mg/kg	330	32	32	22	25	18	26	28	20	18	32
Cobalt	mg/kg	8.6	6.4	8.7	5.5	4.8	5.9	5.1	4.8	4.3	6.8	4.3
Copper	mg/kg	2400	50	440	46	40	30	44	140	30	660	440
Fluoride	mg/kg	24.0	4.9	45.0	7.4	4.4	4.8	4.1	2.8	4.5	13.0	6.9
Iron	mg/kg	39000	19000	16000	15000	17000	14000	17000	17000	15000	13000	18000
Lead	mg/kg	340	28	130	30	25	23	29	64	24	260	190
Mercury	mg/kg	0.045	0.027	0.047	0.034	0.023	0.028	0.033	0.034	0.029	<0.020	0.083
Nickel	mg/kg	38	19	34	20	20	25	19	24	18	75	84
Selenium	mg/kg	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<4.0	<3.0
Silver	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.0	<1.0
Sulfate	mg/kg	460	1200	540	4400	1700	840	990	2000	970	530	3400
Tin	mg/kg	1.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<6.0	1.3
Vanadium	mg/kg	580	37	32	18	22	12	27	30	15	13	36
Zinc	mg/kg	2600	87	480	87	81	67	91	210	70	1400	780
pH		5.500	5.440	5.680	5.670	5.760	5.450	5.530	6.040	5.610	9.010	5.810
Arsenic, TCLP	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Barium, TCLP	mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.2	<1.0
Cadmium, TCLP	mg/l	0.055	0.002	0.14	0.014	0.002	0.002	0.002	0.016	0.002	0.026	4.4
Chloride, TCLP	mg/l	12.0	41.0	15.0	27.0	20.0	13.0	32.0	35.0	48.0	8.2	34.0
Chromium, TCLP	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Cobalt, TCLP	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.026
Copper, TCLP	mg/l	0.078	0.013	0.49	0.028	0.023	0.015	0.019	0.094	0.006	2.4	1.1
Fluoride, TCLP	mg/l	1.2	<0.25	1.1	0.27	<0.25	<0.25	<0.25	0.42	<0.25	0.45	5.1
Iron, TCLP	mg/l	0.03	1.2	0.07	0.04	0.14	0.08	0.14	0.69	0.15	0.2	0.12
Lead, TCLP	mg/l	0.057	<0.002	0.03	<0.002	<0.002	<0.002	<0.002	0.011	<0.002	0.14	0.26
Mercury, TCLP	mg/l	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Nickel, TCLP	mg/l	0.11	<0.02	0.11	0.04	<0.02	<0.02	<0.02	0.05	<0.02	0.25	0.55
Selenium, TCLP	mg/l	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Silver, TCLP	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sulfate, TCLP	mg/l	24	85	27	91	110	41	59	72	77	49	400
Tin, TCLP	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium, TCLP	mg/l	0.061	0.009	0.078	0.029	0.011	0.008	<0.005	0.051	0.006	0.021	0.079

S9A	S9B	S10A1	S10A2	S10B	S11A	S11B	S12B	S13B	S14B	S15B	S16B1	S16B2	S17B
11.0	12.0	27.0	35.0	27.0	28.0	33.0	30.0	34.0	25.0	28.0	26.0	30.0	27.0
230	170	130	150	110	160	94	160	170	100	210	76	150	150
3.3	3.5	2.4	1.0	<0.6	<0.6	<0.6	10.0	16.0	1.0	10.0	<0.6	0.7	1.6
22	26	14	17	12	11	10	15	15	12	14	12	15	16
6.5	6.5	6.0	5.5	4.9	9.5	6.2	6.9	13.0	6.6	8.1	4.7	7.0	7.0
33	26	140	55	20	15	12	140	170	27	36	14	18	15
16.0	38.0	20.0	11.0	6.2	9.9	7.4	25.0	33.0	18.0	39.0	11.0	11.0	24.0
16000	16000	13000	15000	11000	13000	14000	14000	15000	11000	15000	12000	14000	14000
25	27	65	36	17	11	10	57	130	19	54	11	15	12
0.032	0.036	0.057	0.036	0.031	0.025	0.032	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
21	19	23	21	15	18	12	36	39	16	21	14	20	18
<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
290	390	340	430	450	340	670	300	800	700	250	1300	1600	1800
<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.30	<6.0	<0.30	<0.30	<0.30	<0.30	<0.30
21	30	10	9	3	9	11	8.4	27	2.1	11	1.9	3.9	6.1
67	80	200	150	68	56	50	390	420	82	360	57	79	70
5.800	5.700	5.590	5.740	5.580	6.220	5.920	6.500	7.520	7.270	7.440	6.080	6.340	6.830
0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
0.002	0.007	0.02	0.011	0.004	0.003	0.005	0.065	0.036	0.065	0.1	0.007	0.005	0.05
2.0	7.5	5.4	3.4	7.3	4.6	4.2	12.0	10.0	19.0	6.1	9.5	27.0	18.0
<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.042	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
<0.005	0.006	0.076	0.038	<0.005	<0.005	0.006	0.069	0.039	0.071	0.054	0.049	0.006	0.028
0.41	0.69	0.46	0.28	<0.25	0.29	<0.25	1.3	0.88	0.44	1	<0.25	<0.25	0.32
0.35	0.14	0.4	0.34	0.5	0.17	0.24	0.5	0.5	0.9	0.6	0.4	0.3	0.4
<0.002	<0.002	0.009	0.004	<0.002	<0.002	0.003	0.01	0.011	0.057	0.023	<0.002	<0.002	0.005
<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
<0.02	<0.02	0.04	<0.03	0.04	<0.02	0.07	0.14	0.047	<0.03	0.04	<0.03	<0.03	<0.03
<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
10	16	23	18	26	10	32	33	45	44	23	91	103	86
<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
0.005	0.011	0.013	0.01	0.042	0.005	0.13	0.036	0.005	0.005	0.005	0.005	0.005	0.007

S18B	S19B	S20B	S21A	S21B	S22A	S22B	S23A	S23B	S24A	S24B	S25A	S25B	S26A
28.0	19.0	27.0	18.0	30.0	20.0	26.0	16.0	27.0	20.0	16.0	42.0	29.0	38.0
140	69	100	74	100	73	64	57	50	90	39	180	140	160
<0.6	<0.6	<0.6	2.0	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	16.0	<0.6	<0.6
13	7.5	12	6.2	13	7.4	10	5.7	12	7.3	10	25	16	22
5.9	4.3	12.0	5.4	4.9	8.6	4.8	6.0	4.7	5.8	2.3	6.3	7.2	6.7
53	9	14	35	10	9	9	6	12	7	7	53	14	26
21.0	6.6	9.4	20.0	4.5	7.1	4.1	12.0	4.0	6.3	3.4	46.0	7.3	11.0
13000	8800	15000	7700	13000	8900	12000	7600	14000	9900	8200	16000	13000	17000
29	8	13	22	10	7	8	6	9	6	5	36	13	30
0.049	0.032	0.024	0.033	0.027	0.027	0.026	0.026	0.031	0.023	0.032	<0.02	<0.02	<0.02
18	11	22	13	14	12	12	9	12	13	8	21	17	18
<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<4.0	<4.0	<4.0
<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0
1500	820	600	270	630	670	750	2300	750	1100	700	220	570	130
<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<2.0	<0.6	<0.6	<0.6	<0.30	<0.30	<0.30
3	1	14	6	3	10	3	7	<1	16	<1	16	6.2	14
120	44	60	160	54	37	49	34	53	39	31	180	61	110
5.550	6.410	5.940	5.720	5.520	5.860	6.060	6.070	5.930	5.960	5.840	7.260	6.840	6.610
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
0.042	0.002	0.002	0.007	<0.002	0.003	0.013	0.003	<0.002	<0.002	0.029	0.045	<0.002	0.054
23.0	15.0	8.7	3.8	7.8	15.0	17.0	30.0	20.0	28.0	25.0	10.0	16.0	12.0
<0.004	<0.004	<0.004	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.007	<0.004	<0.004	<0.004
<0.005	<0.005	<0.005	<0.005	<0.005	0.012	<0.005	0.008	<0.005	0.012	0.008	0.029	0.026	0.063
0.2	0.026	0.018	0.38	<0.02	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.096
0.98	0.25	0.25	0.32	<0.25	0.36	<0.25	0.29	<0.25	<0.25	<0.25	2.2	<0.25	0.32
0.3	0.14	0.39	0.25	0.34	0.24	0.1	0.25	0.1	0.38	0.12	0.2	0.2	0.01
0.011	<0.002	<0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.01	0.04
<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
0.05	<0.03	<0.03	0.03	0.02	0.05	<0.03	0.044	<0.03	0.06	<0.03	0.06	0.06	0.17
<0.020	<0.020	<0.020	<0.020	0.01	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.36	<0.01	<0.01	<0.01
27	25	21	11	28	32	32	120	29	50	30	13	32	12
<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
0.006	0.005	0.005	0.005	0.006	0.08	0.011	0.066	0.02	0.096	0.015	0.14	0.093	0.15

S26B	S27A	S27B	S28A	S28B	S29A	S29B	S30A	S30B	S31A	S31B	S32A	S32B	S33A
30.0	26.0	21.0	23.0	22.0	30.0	28.0	43.0	33.0	35.0	21.0	25.0	31.0	25.0
110	130	82	150	86	160	190	170	180	230	120	87	170	130
<0.6	21.0	<0.6	78.0	<0.6	1.8	<0.6	4.9	<0.6	<0.6	<0.6	3.9	<0.6	8.5
18	15	10	19	10	16	12	23	16	24	9.1	10	12	13
6.0	4.8	5.6	4.2	6.2	7.4	9.8	8.0	8.6	6.3	6.4	7.3	14.0	7.7
13	830	10	1500	14	120	11	230	14	88	19	1100	15	2200
6.4	24.0	3.2	12.0	3.6	14.0	4.9	13.0	3.2	17.0	8.6	6.5	5.3	14.0
16000	13000	12000	11000	11000	15000	14000	19000	19000	15000	8800	11000	15000	10000
10	310	8	970	10	54	8	110	10	51	13	390	10	750
<0.02	0.042	0.03	0.13	0.024	0.039	0.027	0.07	0.026	<0.02	<0.02	0.036	0.027	<0.02
19	50	13	72	14	23	20	25	18	22	18	99	25	150
<4.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<4.0	<4.0	<3.0	<3.0	<4.0
<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	4.0	<1.0	<1.0	<2.0
290	570	370	350	430	1200	690	930	720	190	340	6000	730	60
<0.30	1.1	<0.6	7.2	<0.6	<0.6	<0.6	<0.6	<0.6	<0.30	<0.30	1.3	<0.6	6
7.8	10	9	9	7	12	22	20	15	6.3	6.1	14	35	11
58	680	44	1600	50	470	54	860	62	150	47	980	61	1500
6.320	5.810	5.510	6.300	5.750	6.100	5.760	5.790	5.690		6.690	5.740	5.800	7.180
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
0.01	0.016	<0.002	0.11	0.002	0.011	0.002	0.11	<0.002	0.019	0.003	0.041	<0.002	0.19
16.0	2.9	5.9	11.0	14.0	22.0	26.0	24.0	15.0	3.6	5.4	22.0	16.0	5.6
0.006	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
0.042	0.046	<0.005	0.05	<0.005	0.03	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	0.007
0.031	0.12	0.08	0.08	0.02	0.14	0.02	0.24	0.47	0.32	0.04	0.7	0.04	10
<0.25	<0.25	<0.25	0.67	<0.25	<0.25	<0.25	0.55	<0.25	0.5	0.32	<0.25	<0.25	0.78
0.2	0.07	0.03	0.05	0.26	0.17	0.35	0.31	0.02	0.2	0.1	0.04	0.1	0.1
0.01	0.027	0.002	0.077	0.002	0.008	0.002	0.028	0.071	0.036	0.003	0.13	0.004	1.4
<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
0.08	0.14	<0.03	0.18	0.04	0.07	<0.03	0.07	0.02	0.14	0.05	0.17	0.04	1.1
<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
21	24	48	12	20	52	75	24	32	8	23	160	36	16
<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
0.16	0.11	0.014	0.13	0.022	0.099	0.027	0.02	0.005	0.007	0.028	0.017	0.051	0.024

S33B	S34A	S34B	S35A	S35B	S36A	S36B	S37A	S37B	S38A	S38B1	S38B2	S39A	S39B
23.0	25.0	28.0	30.0	31.0	28.0	43.0	45.0	35.0	34.0	33.0	25.0	31.0	33.0
120	170	150	160	110	130	180	210	150	240	110	86	230	160
<0.6	0.8	<0.6	5.0	<0.6	12.0	2.1	<0.6	<0.6	<0.6	2.1	<0.6	0.9	<0.6
10	22	14	14	14	13	19	27	19	17	18	14	16	17
4.9	5.2	5.4	5.7	5.1	7.5	5.4	6.9	5.5	5.4	6.4	4.7	6.5	5.8
13	160	11	160	13	190	31	60	16	20	14	12	79	14
9.1	6.1	13.0	16.0	9.5	21.0	11.0	19.0	17.0	28.0	15.0	13.0	8.4	5.7
9900	9900	12000	14000	15000	13000	18000	17000	14000	14000	11000	9900	12000	13000
8.6	48	9.4	74	9	67	14	48	12	13	11	9	67	10
<0.02	<0.02	<0.02	0.039	0.026	0.046	0.024	<0.02	<0.02	<0.02	<0.020	<0.020	<0.020	<0.020
16	24	15	20	15	34	18	21	18	15	18	15	19	17
<4.0	<4.0	<4.0	<3.0	<3.0	<3.0	<3.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
130	150	290	310	290	320	330	57	320	440	540	520	130	250
<0.30	<0.30	<0.30	<0.6	<0.6	<0.6	<0.6	<0.30	<0.30	<0.30	<0.30	0.3	0.3	0.3
3.5	5.7	7.2	8	3	8	10	16	4.3	9.1	4.4	2.8	18	6.6
41	200	44	260	57	480	120	200	71	81	56	51	270	52
7.270	6.620	6.660	6.130	6.150	5.980	6.330	6.900	6.880	6.840	8.240	8.110	7.570	8.090
<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
<0.002	0.009	<0.002	0.045	<0.002	0.072	0.004	0.01	0.005	0.013	0.003	0.003	0.012	0.004
3.2	4.3	6.9	5.4	4.4	6.8	7.4	8.1	8.5	11.0	13.0	11.0	16.0	9.0
<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
<0.005	<0.005	0.027	0.033	<0.005	0.033	<0.005	0.032	<0.005	0.018	<0.005	<0.005	0.034	0.03
0.03	0.12	0.02	0.23	0.04	0.07	0.02	0.04	0.04	0.04	<0.005	0.02	0.048	0.02
0.27	0.28	0.29	0.3	<0.25	0.4	<0.25	0.32	0.46	0.47	0.3	0.33	<0.25	<0.25
0.3	0.32	0.4	0.13	0.39	0.83	0.18	0.6	0.1	0.2	0.3	0.1	0.1	0.3
0.002	0.011	0.004	0.079	0.002	0.077	0.002	0.038	0.002	0.016	0.004	0.005	0.086	$0.009
<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
0.04	0.08	0.06	0.09	0.04	0.13	0.04	0.07	0.07	0.05	0.05	0.06	0.08	0.08
<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
<0.01	<0.01	<0.01	0.005	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
13	16	18	33	8	15	15	9.0	24	25	25	24	9	21
<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
0.02	0.01	0.059	0.057	0.036	0.057	0.036	0.13	0.038	0.055	0.025	0.024	0.069	0.035

LL1-6	LL1-18	LL2-6	LL2-18	LL3-6	LL3-18	LL4-6	LL4-18	LL5-6	LL5-18	LL6-6	LL6-18	LL7-6	LL7-18
11.0	7.0	25.0	28.0	25.0	31.0	24.0	25.0	33.0	22.0	24.0	18.0	23.0	27.0
37	48	250	230	150	180	170	190	180	130	150	120	100	250
10.0	<0.60	430.0	11.0	38.0	4.4	80.0	<0.60	17.0	0.9	70.0	23.0	160.0	9.4
6.3	8	13	15	12	16	16	12	19	13	13	15	14	15
1.7	2.2	3.5	5.8	5.6	5.1	3.9	4.2	6.1	4.1	3.9	5.7	4.2	6.0
160	2	1900	34	150	20	730	14	82	10	43	17	500	17
12.0	9.6	71.0	79.0	67.0	67.0	120.0	97.0	250.0	32.0	150.0	110.0	160.0	71.0
5700	5200	11000	15000	12000	12000	10000	14000	12000	9200	10000	8600	9500	12000
77	11	1800	22	72	17	580	16	96	14	32	13	260	19
0.043	0.03	1.2	0.041	0.14	0.033	0.095	0.037	0.23	0.038	0.053	0.043	0.48	0.02
16	7.4	420	110	150	140	64	18	48	16	100	35	99	29
<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
210	220	1600	4400	2600	2700	1100	1300	2600	2900	1000	990	1400	1000
<2.0	<2.0	3	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
5.4	3.4	5.1	4	6.8	4.8	6.7	4.3	9.9	4.5	4.2	1.7	3	2.5
190	42	4300	190	830	180	970	67	250	68	450	160	1100	140
5.980	5.750	6.610	5.960	5.770	5.720	5.710	5.780	5.720	5.390	5.700	5.920	5.490	5.670
<0.020	<0.020	0.07	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
0.15	0.01	0.003	0.092	1.3	0.019	1.2	0.005	0.27	0.01	1.1	0.24	1.6	0.076
4.8	5.2	21.0	20.0	20.0	21.0	8.6	13.0	27.0	31.0	5.3	10.0	7.9	9.1
0.006	0.029	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
0.015	0.016	0.008	0.017	0.02	0.012	0.017	0.018	0.019	0.014	0.011	<0.005	0.008	0.002
0.19	<0.003	<0.003	0.04	0.49	0.23	0.26	0.02	0.18	0.003	0.15	0.06	0.14	0.04
0.58	0.31	4.8	1.9	5.2	1.1	5.6	0.71	4.1	0.44	5.2	2.2	4.4	1
0.12	<0.10	62	0.2	0.4	<0.10	0.2	0.5	0.6	0.6	0.6	0.2	0.9	0.2
0.12	0.023	0.12	0.01	0.38	0.042	0.28	0.006	0.17	0.009	0.028	0.004	0.053	0.005
<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
0.13	0.07	0.9	0.47	2.6	0.38	0.53	0.04	0.32	0.04	0.71	0.22	0.62	0.083
0.02	<0.020	0.02	<0.020	0.03	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
15	15	94	130	140	290	34	43	100	120	39	37	51	41
<0.0040	<0.0040	0.004	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
0.027	0.031	0.058	0.032	0.061	0.033	0.024	0.028	0.017	0.027	0.015	0.015	0.018	0.008

LL8-6	LL8-18
25.0	20.0
140	190
270.0	5.3
14	12
4.5	4.6
240	14
130.0	28.0
11000	11000
180	24
0.31	0.05
76	35
<5.0	<5.0
<3.0	<3.0
2400	1100
<2.0	<2.0
2.8	2.3
1400	150
5.330	5.560
<0.020	<0.020
<1.0	<1.0
4.3	0.056
6.6	11.0
<0.004	<0.004
0.022	<0.005
0.21	0.02
8.2	0.4
<0.10	0.4
0.32	0.009
<0.00020	<0.00020
1.1	0.08
<0.020	<0.020
<0.010	<0.010
120	37
<0.0040	<0.0040
0.019	0.014

Zinc, TCLP	mg/l	7.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	7.0	20.0
Cadmium, SPLP	mg/l	0.002	0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	0.026
Fluoride, SPLP	mg/l	*	0.51	*	0.86	0.56	4	0.48	2.2	0.46	0.95	16
Lead, SPLP	mg/l	0.011	0.004	0.002	0.002	0.001	0.007	0.001	0.002	0.001	0.004	0.003
Mercury, SPLP	mg/l	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.0002
Nickel, SPLP	mg/l	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.016

<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.0	4.0	<1.0	<1.0	<1.0
0.002	0.002	0.002	0.02	0.004	0.002	0.002	<0.0020	0.002	0.002	0.003	0.002	0.002	0.002
1.5	2.3	1.6	0.99	0.63	1.2	0.71	3.7	4.2	1.2	3.6	0.73	0.78	2.6
0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.004	0.002	0.01	0.001	0.003	0.002
<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.012	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.0
0.002	0.002	0.005	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.006
0.78	0.72	0.77	1.3	0.34	*	*	*	*	*	*	*	*	*
0.001	0.001	0.005	0.005	<0.002	0.019	<0.002	0.001	0.005	0.001	<0.002	0.003	<0.002	0.003
<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
<0.005	0.005	<0.005	<0.005	<0.005	0.01	<0.005	0.009	0.006	0.005	<0.005	0.008	<0.005	0.018

<1.0	<1.0	<1.0	3.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	16.0
<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
*	*	*	*	*	*	*	*	*	*	*	*	*	*
0.004	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	0.01	0.003	0.001	<0.002	0.023	<0.002	0.023
<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
0.012	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	0.018

<1.0	<1.0	<1.0	2.0	<1.0	3.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0030	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
*	*	*	*	*	*	*	*	*	*	*	*	*	*
0.001	<0.002	0.001	0.006	0.001	0.001	0.001	0.0070	0.004	0.006	<0.002	0.003	0.005	<0.002
<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.0002	<0.0002	<0.0002
0.01	0.007	<0.005	0.007	<0.005	<0.005	<0.005	0.0080	<0.005	0.006	<0.005	0.008	0.005	0.005

3.0	<1.0	6.0	<1.0	13.0	<1.0	8.0	<1.0	4.0	<1.0	5.0	<1.0	10.0	<1.0
0.005	<0.002	<0.002	<0.0020	0.021	<0.0020	0.004	<0.0020	0.035	<0.0020	0.009	<0.0020	0.05	<0.0020
*	*	*	3.1	3.6	*	<0.25	*	9.8	<0.25	8.6	29	*	1.6
0.002	<0.002	0.008	<0.002	0.004	<0.002	0.005	<0.0010	0.035	<0.0010	<0.0010	<0.0010	0.014	<0.0010
<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
0.016	<0.005	0.04	0.026	0.076	0.033	0.012	0.005	0.043	0.005	0.018	0.013	0.037	0.008

Long Lake Surface Water Samples											
IEPA Samples - March 1999											
	Cd	Pb	F	Zn	pH	Ca	Mg	Hardness	Cu	B	TDS
Sample ID	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
S501	0.013	0.034	11.8	0.27	8.6	77	20	274.5	0.083	0.96	976
S502	0.008	0.019	20.0	0.16	9.0	67	19	245.4	0.067	1.7	1330
S503	0.008	0.017	16.0	0.18	8.4	65	18	236.3	0.052	1.2	1100
S504	0.006	0.011	14.1	0.14	8.3	71	20	259.5	0.042	1.1	1030
S505	<0.005	0.011	14.3	0.12	8.4	69	19	250.4	0.037	1.1	1030
S506	<0.005	0.012	15.1	<0.1	8.2	61	17	222.2	0.029	1.1	1010
S507	<0.005	0.007	12.4	<0.1	8.3	59	16	213.1	0.017	0.87	827
S508	<0.005	0.005	0.3	0.11	8.2	78	17	264.7	0.044	0.13	471

Fe (total)
mg/L
1.5
0.95
2.4
2.0
1.5
3.8
3.6
0.19

ATTACHMENT 2

[1] Based upon knowledge of the geology in the vicinity of the ZORA, we feel that shallow groundwater will meet the definition of Class II groundwater. **I think that IEPA considers the GW Class I**

[2] CSD Environmental, Inc., January 2000. *Zinc Oxide Spill Remediation Plan.*

[3] Questions and Answers about Dioxins. USEPA, July 2000.

http://www.epa.gov/ncea/pdfs/dioxin/dioxin%20questions%20and%20answers.pdf

[4] According to Tom Hornshaw of IEPA (telephone communication April 2, 2001), there are currently no dioxin

standards. USEPA has withdrawn the dioxin slope factor and is in the process of reviewing the available toxicological data.

Attachment 3.

As noted above, organic compounds are not expected to be present in the Zinc Oxide material. Therefore based on the definition of COC given above, there are no organic COCs for surface water.

Dioxins:
As stated above, organic compounds are not constituents of the Zinc Oxide material. Therefore, dioxins (CDDs/CDFs) should not be considered as COCs for the ZORA.

Dioxins are prevalent in the environment, from combustion processes such as commercial or municipal waste incineration, burning of fuels, burning of household trash and during forest fires. Certain types of chemical manufacturing and chlorine bleaching of pulp and paper also create small quantities of dioxins. Dioxins may also be produced at very low levels by natural processes. Currently, the uncontrolled burning of residential waste and accidental fires at landfills are thought to be among the largest sources of dioxins to the environment in the United States.[3]

CDDs/CDFs were measured by Chemetco as part of the Containment Area cleanup and also by IEPA (see Tables 4 and 5). Toxicity equivalences (TEQs) calculated from the Chemetco ZORA samples (see Table 4) did not exceed 0.55 ppb. TEQs calculated for samples collected by IEPA from the Containment Area did not exceed 0.123 ppb. Therefore, even if there were an applicable standard for CDDs/CDFs[4], it is evident that the levels in Long Lake (that could only be less than the source area) would not be significant.

Several Records of Decision (RODs) for sites where dioxins are present have been reviewed. In three of these RODs, the action level for dioxin cleanup was 20 ppb TEQ. For other NPL sites, the dioxin action level was 1 ppb TEQ. Dioxin levels at the Chemetco site are significantly lower than these action levels adopted at NPL sites.

[1] Based upon knowledge of the geology in the vicinity of the ZORA, we feel that shallow groundwater will meet the definition of Class II groundwater. **I think that IEPA considers the GW Class I**

[2] CSD Environmental, Inc., January 2000. *Zinc Oxide Spill Remediation Plan.*

[3] Questions and Answers about Dioxins. USEPA, July 2000.

standards. USEPA has withdrawn the dioxin slope factor and is in the process of reviewing the available toxicological data.

ENVIRON

Date: March 5, 2001

To: Heather Young, Chemetco

From: Roy Ball
Barbara Coughlin

Re: Remediation Objectives for Containment Cells 1 – 4, Chemetco Facility

Historic releases from the Chemetco Facility (Chemetco) resulted in the presence of metal contamination in a portion of Long Lake (the Zinc Oxide Spill Area). The bulk of the zinc oxide material released was segregated into four containment cells (Containment Cells 1 – 4). Remediation activities for the Zinc Oxide Spill Area have resulted in the removal and off-site disposal of contaminated materials from the containment cells. The Illinois "Tiered Approach to Corrective Action Objectives" (TACO, 35 Illinois Administrative Code (IAC) 742) is used herein to develop appropriate Remediation Objectives (SROs) for the Contaminants of Concern (COCs) remaining in Containment Cells # 1 – 4.

"Contaminant of Concern" (COC) is defined in TACO as:

> *"any contaminant that is expected to be present at the site based upon past and current land uses and associated releases that are known to the person conducting a remediation based upon reasonable inquiry" (35 IAC 742.200).*

For the Zinc Oxide Spill Area, the COCs proposed herein are based upon the analysis of the zinc oxide waste and of the sediments and surface water in Long Lake.[1] Analysis of the zinc oxide material itself indicates that barium, cadmium, lead, and zinc are present in elevated concentrations (based on the comparison of total and leachable results to ~~uncontaminated soil~~ Solute levels). Analysis of Long Lake surface water and sediments indicates that boron, fluoride, and iron (in surface water) and cadmium, lead and zinc (in sediments) may be present at elevated levels. Therefore, the proposed COCs for the Zinc Oxide Spill Area are barium, boron, cadmium, fluoride, iron, lead, and zinc. Analytical results for samples collected from Containment Cells 1 – 4 for the proposed COCs are presented in Table 1.

TACO presents remedial objectives for soil ingestion & inhalation, and groundwater ingestion exposure pathways. The assumptions applied in developing the soil ingestion & inhalation SROs are appropriate to Containment Cells 1 – 4. The assumptions used in developing the soil component of the groundwater ingestion exposure pathway are not applicable to the conditions in Containment Cells 1 – 4. The impacts, if any, of the zinc oxide releases on Long Lake surface water and sediments outside of the containment areas will be investigated in accordance with the Long Lake Scope of Work (SOW) prepared in response to the Partial Consent Decree.

Therefore the Remediation Objectives proposed herein consider only the soil ingestion & inhalation exposure pathways.

The Chemetco Facility is classified as an "industrial/commercial property" based upon the definition presented in TACO (35 IAC 742.200). When the COCs are compared to Tier I SROs for industrial/commercial properties (See Table 1), there are only two exceedances of the SROs. These exceedances are for lead in samples S28A and S33A.[3] When the analytical results are averaged as provided for in 35 IAC 742.225d, none of the SROs are exceeded.

In Table 2, the COCs are compared to the Tier I residential ingestion & inhalation SROs. As in Table 1, the only exceedances of the SROs are for lead in samples S28A and S33A.[4] When the analytical results are averaged as allowed in 35 IAC 742.225d, none of the residential SROs are exceeded.

In summary, the residual concentrations of the COCs in Containment Cells 1-4 (based on averaged results) do not exceed either the Tier I residential or industrial/commercial SROs for the ingestion & inhalation pathways.

6/30/2000 = Revised sampling of Cont Cells

[1] Long Lake sediments and surface water outside the containment areas are assumed to have been impacted by the releases of zinc oxide.
[2] Cahnovsky, Chris, IEPA, June 1999. *Final Field Sampling and Analysis Report, Long Lake – Mitchell, Illinois.*
[3] The values would likely not exceed SROs based on bio-kinetic modeling (developed by USEPA) in a Tier III analysis.
[4] ibid.

S31B	120	26.0	<0.6	8.6	8,800	13
S32A	87	6.0	3.9	6.5	11,000	390
S32B	170	7.0	<0.6	5.3	15,000	10
S33A	130	38.0	8.5	14.0	10,000	750
S33B	120	26.0	<0.6	9.1	9,900	8.6
S34A	170	25.0	0.8	6.1	9,900	48
S34B	150	26.0	<0.6	13.0	12,000	9.4
S35A	160	13.0	5.0	16.0	14,000	74
S35B	110	7.0	<0.6	9.5	15,000	9
S36A	130	8.0	12.0	21.0	13,000	67
S36B	180	14.0	2.1	11.0	18,000	14
S37A	210	37.0	<0.6	19.0	17,000	48
S37B	150	26.0	<0.6	17.0	14,000	12
S38A	240	28.0	<0.6	28.0	14,000	13
S38B1	110	36.0	2.1	15.0	11,000	11
S38B2	86	18.0	<0.6	13.0	9,900	9
S39A	230	20.0	0.9	8.4	12,000	67
S39B	160	17.0	<0.6	5.7	13,000	10
Tier I Industrial/Commercial SROs						
Industrial Commercia						
Ingestion (mg/kg	140,000	180,000	2,000	120,000	--	400
Inhalation (mg/kg)	910,000	1,000,000	2,800	--	--	--
Construction Worker						
Ingestion (mg/kg	14,000	18,000	200	12,000	--	400
Inhalation (mg/kg)	870,000	1,000,000	59,000	--	--	--

Notes:

Units in mg/kg.

-- means there is no SRO for this exposure pathway.

Highlighted values incidate concentrations which exceed Tier I SROs.

	Barium	Boron	Cadmium	Fluoride	Iron	Lead
S1A	190	100.0	9.9	24.0	39,000	340
S1B	150	65.0	5.2	4.9	19,000	28
S2A	190	59.0	12.0	45.0	16,000	130
S2B	150	50.0	3.5	7.4	15,000	30
S3A	180	52.0	3.3	4.4	17,000	25
S3B	160	42.0	3.3	4.8	14,000	23
S4B	200	50.0	3.3	4.1	17,000	29
S5B	200	54.0	4.8	2.8	17,000	64
S6B	160	40.0	3.1	4.5	15,000	24
S7B	160	19.0	3.0	13.0	13,000	260
S8B	210	63.0	74.0	6.9	18,000	190
S9A	230	41.0	3.3	16.0	16,000	25
S9B	170	47.0	3.5	38.0	16,000	27
S10A1	130	16.0	2.4	20.0	13,000	65
S10A2	150	17.0	1.0	11.0	15,000	36
S10B	110	9.0	<0.6	6.2	11,000	17
S11A	160	8.0	<0.6	9.9	13,000	11
S11B	94	10.0	<0.6	7.4	14,000	10
S12B	160	9.0	10.0	25.0	14,000	57
S13B	170	6.0	16.0	33.0	15,000	130
S14B	100	<2.0	1.0	18.0	11,000	19
S15B	210	60.0	10.0	39.0	15,000	54
S16B1	76	43.0	<0.6	11.0	12,000	11
S16B2	150	26.0	0.7	11.0	14,000	15
S17B	150	25.0	1.6	24.0	14,000	12
S18B	140	8.0	<0.6	21.0	13,000	29
S19B	69	<2.0	<0.6	6.6	8,800	8
S20B	100	8.0	<0.6	9.4	15,000	13
S21A	74	2.0	2.0	20.0	7,700	22
S21B	100	19.0	<0.6	4.5	13,000	10
S22A	73	5.0	<0.6	7.1	8,900	7
S22B	64	3.0	<0.6	4.1	12,000	8
S23A	57	2.0	<0.6	12.0	7,600	6
S23B	50	6.0	<0.6	4.0	14,000	9
S24A	90	3.0	<0.6	6.3	9,900	6
S24B	39	2.0	<0.6	3.4	8,200	5
S25A	180	36.0	16.0	46.0	16,000	36
S25B	140	28.0	<0.6	7.3	13,000	13
S26A	160	33.0	<0.6	11.0	17,000	30
S26B	110	30.0	<0.6	6.4	16,000	10
S27A	130	10.0	21.0	24.0	13,000	310
S27B	82	12.0	<0.6	3.2	12,000	8
S28A	150	17.0	78.0	12.0	11,000	970
S28B	86	5.0	<0.6	3.6	11,000	10
S29A	160	8.0	1.8	14.0	15,000	54
S29B	190	6.0	<0.6	4.9	14,000	8
S30A	170	22.0	4.9	13.0	19,000	110
S30B	180	9.0	<0.6	3.2	19,000	10
S31A	230	31.0	<0.6	17.0	15,000	51

47
980
61
1,500
41
200
44
260
57
480
120
200
71
81
56
51
270
52
610,000
–
61,000
–

Zinc
2,600
87
480
87
81
67
91
210
70
1,400
780
67
80
200
150
68
56
50
390
420
82
360
57
79
70
120
44
60
160
54
37
49
34
53
39
31
180
61
110
58
680
44
1,600
50
470
54
860
62
150

REVIEW COMMENTS ON THE "LONG LAKE SCOPE OF WORK" CHEMETCO, INC.
FEBRUARY 26, 2001

Chemetco Inc. presented a Scope of Work (SOW) document during a negotiation meeting between Chemetco and representatives of IEPA, U.S.EPA, DOJ and the Illinois Attorney General on February 26, 2001. The meeting was convened to discuss a partial consent decree regarding the Chemetco facility. Chemetco's consultant ENVIRON International Corporation prepared the SOW. General comments pertain to the overall deficiencies that were inherent throughout the document. Specific comments provide the location of the text that is discussed.

General Comments

1. The report discusses the scope of Chemetco's plans for conducting an ecological and human health risk assessment in Long Lake surface water and sediment. The SOW goes beyond defining the scope of work and makes determinations of key elements that should be determined by a regulatory review process. The key elements are the Contaminant of Potential Concern (COPCs), the location of background samples, and the location of samples within Long Lake. These determinations were made within the scope of work and are not at this time acceptable to the agencies concerned.

Specific Comments

1. **Section II.** The text discusses that IEPA has conducted a sampling and analysis program dated June 1999, the results from the June 1999 sampling is not used, but some selective results from a March 15th and 16th 1999 sampling results.

2. **Section II, IEPA study.** The results of the March 1999 study are referenced in Tables 1a and 1b. Table 1b does not include the applicable standards for sediments for comparison or the depths of the samples. Subsequent sediment sampling in Long Lake in June of 2000 by IEPA reveals results well elevated compared to the March 1999 results, therefore the entire history of sampling results in Long Lake sediment and waster should be considered when determining contamination levels and extent.

3. **Section II, Selection of Chemicals of Potential Concern.** This paragraph states that based on the March, 1999 study the COPCs have been determined. There is additional sampling results from Long Lake to consider including the September 1998 U.S.EPA report, June, 1999, and June, 2000 IEPA results that need to be weighed to determine the COPCs. The determination of COPCs needs to start with the range of known contaminants and then analyzed for which contaminants are of potential concern.

4. **Section III.** The proposed sampling locations, referenced in Figure 1, need to determine the flow of contaminants away from the source (the 10" pipe with the zinc oxide discharge). An additional 6 samples are proposed 3 at 100ft. intervals west of sample 4, designated 4(a), 4(b), and 4(c); and 3 samples at 100ft. intervals east of sample 6. These sample would help bracket the discharge pipe area.

Determination of the background samples 1,2, and 3 may not be representative due to the fact that Long Lake does not always flow in one specific direction, and is often time stagnant. To say the samples are upgrading of the release is a misnomer. Results from these locations would not provide sampling representative of background conditions.

Samples collected at 0-10" are not defined, are these composite samples? More than one depth of sampling is needed to determine the vertical extent of contamination. Samples from 0-6, 6-12 and 12-18 inches would be appropriate.

5. **SectionIV.** Due to the direct link of the analytical results from the this SOW, we think it is reasonable to have a review of the methods and locations of sampling before it is used in the proposed risk assessments.

State of Illinois
ENVIRONMENTAL PROTECTION AGENCY **MEMORANDUM**

DATE: January 2, 2001

TO: BOL - Division Files

FROM: Chris Cahnovsky - Collinsville FOS CMC

SUBJECT: 1198010003 -- Madison County
Chemetco, Inc.
ILD048843809
FOS File

The following is a summary of the field activities conducted by the Collinsville Regional Office at Chemetco, Inc. for the weeks of December 4, 2000 through December 29, 2000. Chemetco is implementing a Remedial Action Plan Permit (No. B-172) to clean up the released zinc oxide in Containment Areas 1 - 4.

December 19, 2000

Heather Young called to inform me that the ten treated boxes of soil failed for TCLP lead and Cadmium. Ms. Young stated that Chemetco has suspended the treatment and is going to ship the contaminated soil off-site as a hazardous waste. Chemetco is going to send the untreated soil to Peoria Disposal Company (PDC) in Peoria, Illinois.

December 21, 2000

I met with Ms. Young at the site. The purpose of this site visit was to observe the transfer of waste from Containment Area #1 to trailer trucks. Ms. Young explained that the pace of the cleanup was not going fast enough. Therefore, Chemetco decided to start shipping the waste untreated to PDC as a hazardous waste.

December 27, 2000

I conducted an inspection of the Zinc Oxide Release Area. During the week of December 18, 2000 through December 24, 2000, Chemetco shipped nine truck loads of soil to PDC. Each truck contained 24 tons of soil. On December 26, 2000, Chemetco shipped six loads of soil to PDC. Ms. Young intends to ship another six loads today. I observed soil being removed from Containment #1 and loaded into over the road trailer trucks from PDC. These trucks are lined with a plastic before loading and covered with a tarp before leaving the site.

Chemetco is accumulating the initial ten boxes of treated soil in the roll-off container storage area. The container storage area is in the contractors parking lot. These ten boxes failed the TCLP for cadmium and lead. Chemetco has not labeled these boxes with the words "Hazardous Waste" nor have they marked the boxes with their accumulation start date. I also observed that the boxes were not covered. The boxes had plastic sheets over them, but the sheet had fallen into the boxes under the weight of the snow. I explained to Ms. Young that these box must meet the requirements of 35 Ill. Adm. Code 722 and they may only be accumulated on-site for less than 90 days. Ms. Young stated that she was aware that the boxes can only be on-site for less than 90 days. She stated that she will have CDS Environmental label and date the boxes. Ms. Young stated that Chemetco intends to retreat these boxes to meet the Universal Treatment Standards.

December 29, 2000

Heather Young called and informed me that the ten roll-off boxes of "treated" waste will be taken back to Containment Area #1 where the contents will be transferred to trucks and taken to PDC for treatment and disposal.

CNC/CHEMETCO/Chem78.rapmemo.wpd

CC: BOL - Collinsville File
CC: Chris Perzan - DLC
CC: Kevin Lesko - BOL Permits Section

COVER SHEET FAX

To: Chris Cahnovsky
Fax #: (618) 346-5155
Subject: CHEMETCO, Inc. (Remedial Action Permit No. B-172)
Date: December 09, 2000
Pages: 1, including this cover sheet.

Dear Mr. Cahnovsky;

This fax transmittal constitutes Chemetco's summary of weekly activities associated with remedial action permit No. B-172. The summary is presented in chronological order, and was prepared in accordance with Item 6 of the October 05, 2000 IEPA "Remedial Action Plan Permit" (RAPP) approval letter.

12/04 - 12/08 No treatment was conducted this week. All activities have been suspended pending receipt of laboratory analytical data. The roll-off container storage area was inspected on 12/08. No leakage from any of the containers was noted.

If you have any questions, or need any additional information, please don't hesitate to contact Heather Young or myself.

Respectfully;

Joseph W. Truesdale
Project Manager

CC: Heather Young, (Chemetco)

From the desk of...

Joseph W. Truesdale
Project Manager

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

217/522-4085
Fax: 217/522-4087

COVER SHEET FAX

To: Chris Cahnovsky
Fax #: (618) 346-5155
Subject: CHEMETCO, Inc. (Remedial Action Permit No. B-172)
Date: December 15, 2000
Pages: 1, including this cover sheet.

Dear Mr. Cahnovsky;

This fax transmittal constitutes Chemetco's summary of weekly activities associated with remedial action permit No. B-172. The summary is presented in chronological order, and was prepared in accordance with Item 6 of the October 05, 2000 IEPA "Remedial Action Plan Permit" (RAPP) approval letter.

12/11 - 12/15 No treatment was conducted this week. All activities have been suspended pending receipt of laboratory analytical data. The roll-off container storage area was inspected on 12/13. No leakage from any of the containers was noted.

If you have any questions, or need any additional information, please don't hesitate to contact Heather Young or myself.

Respectfully;

Joseph W. Truesdale
Project Manager

CC: Heather Young, (Chemetco)

From the desk of...

Joseph W. Truesdale
Project Manager

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

217/522-4085
Fax: 217/522-4087

COVER SHEET

FAX

To: Chris Cahnovsky
Fax #: (618) 346-5155
Subject: CHEMETCO, Inc. (Remedial Action Permit No. B-172)
Date: December 21, 2000
Pages: 3, including this cover sheet.

Dear Mr. Cahnovsky;

This fax transmittal constitutes Chemetco's summary of weekly activities associated with remedial action permit No. B-172. The summary is presented in chronological order, and was prepared in accordance with Item 6 of the October 05, 2000 IEPA "Remedial Action Plan Permit" (RAPP) approval letter.

12/18 - 12/21 No treatment was conducted this week. The roll-off container storage area was inspected on 12/21. No leakage from any of the containers was noted. Results from initial sampling indicted that the treated material failed the characteristic hazardous waste criteria for Lead and Cadmium.

In accordance with Item 18 of the April 26, 2000 IEPA letter approving the March 2000 "Zinc Oxide Spill Remediation Plan - Phase I - Material Removal and Partial Closure"; five loads of material were transported from the site and disposed of at a properly permitted hazardous waste facility on 12/20/00. Information pertinent to the transport and disposal of the above mentioned material is summarized in the following table.

Manifest Number	Weight (tons)	Doc. Number
IL 9272956	24	LL001
IL 9272957	24	LL002
IL 9272958	24	LL003
IL 9272959	21	LL004
IL 9272960	20	LL005

If you have any questions, or need any additional information, please don't hesitate to contact Heather Young or myself.

Respectfully;

Joseph W. Truesdale
Project Manager

CC: Heather Young, (Chemetco)

From the desk of...

Joseph W. Truesdale
Project Manager

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

217/522-4085
Fax: 217/522-4087

Waste Type: CONTAMINATED SOIL (PILE)

CHEMETCO, Inc.
1198010003 - Madison County
RCRA Remedial Action Plan

Permit No. B-172

Date Treated	Container ID	Sample(s) Collected	Initials	Inspection Results	Re-Inspection Results	Initials	Analytical Results	Initials	Transport Date	Manifest Number	Scale Weight
11/20/00	CS1	CS1A/CS1B	jwt	☑ Pass ☐ Fail	☐ Pass ☐ Fail	jwt	☐ Pass ☑ Fail	jwt			
11/20/00	CS 2	CS2A/CS2B	jwt	☑ Pass ☐ Fail	☐ Pass ☐ Fail	jwt	☐ Pass ☑ Fail	jwt			
11/2[illegible]	CS 3	CS3A/CS3B	jwt	☑ Pass ☐ Fail	☐ Pass ☐ Fail	jwt	☐ Pass ☑ Fail	jwt			
11/[illegible]	CS4	CS4A/CS4B	jwt	☑ Pass ☐ Fail	☐ Pass ☐ Fail	jwt	☐ Pass ☑ Fail	jwt			
11/21/[illegible]	CS 5	CS5A/CS5B	[illegible]	☑ Pass ☐ Fail	☐ Pass ☐ Fail	[illegible]	☐ Pass ☑ Fail	jwt			
11/21/00	CS 6	CS6A/CS6B	[illegible]	☑ Pass ☐ Fail (NA)	☑ Pass ☐ Fail	jwt	☐ Pass ☑ Fail	jwt			
11/21/00	CS 7	CS7A/CS7B	jwt	☑ Pass ☐ Fail	☐ Pass ☐ Fail	jwt	☐ Pass ☑ Fail	jwt			
11/21/[illegible]	CS 8	CS8A/CS8B	jwt	☑ Pass ☐ Fail	☐ Pass ☐ Fail	NW	☐ Pass ☑ Fail	jwt			
11/21/00	CS 9	CS9A/CS9B	jwt	☑ Pass ☐ Fail	☐ Pass ☐ Fail	[illegible]	☐ Pass ☑ Fail	jwt			
11/21/00	CS 10	CS10A/CS10B	jwt	☑ Pass ☐ Fail	☐ Pass ☐ Fail	jwt	☐ Pass ☑ Fail	jwt			
				☐ Pass ☐ Fail	☐ Pass ☐ Fail		☐ Pass ☐ Fail				
				☐ Pass ☐ Fail	☐ Pass ☐ Fail		☐ Pass ☐ Fail				
				☐ Pass ☐ Fail	☐ Pass ☐ Fail		☐ Pass ☐ Fail				
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				☐ Pass ☐ Fail	☐ Pass ☐ Fail		☐ Pass ☐ Fail				

CSD Environmental Services, Inc.
2220 Yale Blvd., Springfield, IL

Phone: (217) 52[illegible]-4085
Fax: (217) [illegible]4087

COVER SHEET

FAX

To: Chris Cahnovsky
Fax #: (618) 346-5155
Subject: CHEMETCO, Inc. (Remedial Action Permit No. B-172)
Date: December 31, 2000
Pages: 2, including this cover sheet.

Dear Mr. Cahnovsky;

This fax transmittal constitutes Chemetco's summary of weekly activities associated with remedial action permit No. B-172. The summary is presented in chronological order, and was prepared in accordance with Item 6 of the October 05, 2000 IEPA "Remedial Action Plan Permit" (RAPP) approval letter.

In accordance with Item 18 of the April 26, 2000 IEPA letter approving the March 2000 "Zinc Oxide Spill Remediation Plan - Phase I - Material Removal and Partial Closure"; twenty loads of material were transported from the site and disposed of at a properly permitted hazardous waste facility between 12/22 and 12/29 of 2000. Information pertinent to the transport and disposal of the above mentioned material is summarized in the following table(s).

12/22

Manifest Number	Weight (tons)	Doc. Number
IL 9272961	23	LL006
IL 9272962	21	LL007
IL 9272963	24	LL008
IL 9272964	23	LL009

12/26

Manifest Number	Weight (tons)	Doc. Number
IL 9272965	22	LL010
IL 9272966	24	LL011
IL 9272967	23	LL012
IL 9272968	22	LL013
IL 9272969	24	LL014
IL 9272970	23	LL015

12/27

Manifest Number	Weight (tons)	Doc. Number
IL 9272971	24	LL016
IL 9272972	24	LL017
IL 9272973	23	LL018
IL 9272977	23	LL022

12/29

Manifest Number	Weight (tons)	Doc. Number
IL 9272974	23	LL019
IL 9272975	23	LL020
IL 9272976	22	LL021
IL 9272978	24	LL023
IL 9272979	23	LL024
IL 9272980	21	LL025

No treatment was conducted this week. The roll-off container storage area was inspected on 12/28. No leakage from any of the containers was noted. Results from initial sampling indicted that the treated material failed the characteristic hazardous waste criteria for Lead and Cadmium. Previously "treated" material from roll-offs in the container storage area will be brought back to containment area 1 to be manifested, transported from the site and disposed of at a properly permitted hazardous waste facility.

If you have any questions, or need any additional information, please don't hesitate to contact Heather Young or myself.

Respectfully;

Joseph W. Truesdale
Project Manager

CC: Heather Young, (Chemetco)

From the desk of...

Joseph W. Truesdale
Project Manager

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

217/522-4085
Fax: 217/522-4087

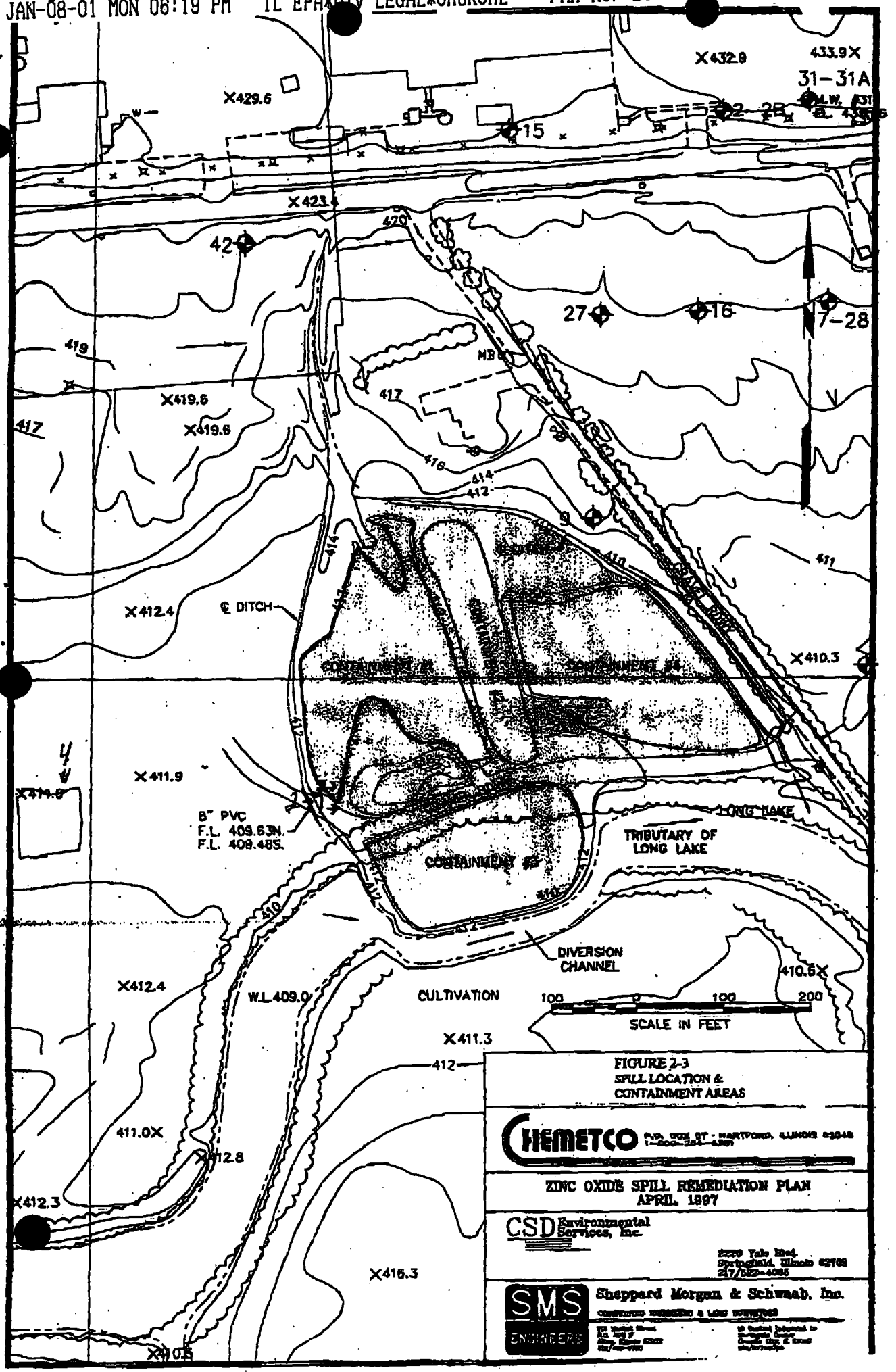

FIGURE 2-3
SPILL LOCATION &
CONTAINMENT AREAS

CHEMETCO P.O. BOX 87 - HARTFORD, ILLINOIS 62048
1-800-254-4307

ZINC OXIDE SPILL REMEDIATION PLAN
APRIL, 1997

CSD Environmental Services, Inc.
2220 Yale Blvd.
Springfield, Illinois 62703
217/522-4065

SMS ENGINEERS Sheppard Morgan & Schwaab, Inc.
CONSULTING ENGINEERS & LAND SURVEYORS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LEGAL COUNSEL
1021 NORTH GRAND AVENUE E., P.O. BOX 19276
SPRINGFIELD, ILLINOIS 62794-9276
TELEPHONE (217)782-5544•FACSIMILE (217)782-9807

DATE: 1/8/01

FACSIMILE TRANSMITTAL SHEET

PLEASE DELIVER THE FOLLOWING PAGE(S) TO:

PARTY'S NAME: Tom Martin

FIRM/COMPANY'S NAME: USEPA, Reg 5, ORC

FACSIMILE NO.:

TELEPHONE NO.:

FROM: Chris Pelzar

TOTAL NUMBER OF PAGES (INCLUDING THIS PAGE): 11

HARD COPY ____WILL ____WILL NOT FOLLOW.

IF YOU DO NOT RECEIVE ALL OF THE PAGES, PLEASE CALL 217-782-5544.

COMMENTS: FYI, Clemetco inspection report w/o photos

Release Area Cost Estimates
Containment Area #1 Only

Estimates of material ***currently in Containment Area #1 (CA 1) only*** which consists of zinc oxide, dirt, rock, shredded wood, and stumps are as follows:

Rock – 280 cubic yards x 2 conv. factor =	560 tons
Zinc Oxide/Dirt – 1625 cubic yards x 1.41 conv. factor=	2291.25 tons
Shredded wood & Stumps – 202 cubic yards x 0.85 conv. factor=	171.70 tons
	3022.95 tons

Analytical Cost – Tested loads consist of 15 TCLP tests @ $258.75/load
Assume 180 loads max and assume that the first 10 rolloffs will be tested and staged. Also assume that 1 out of 5 rolloffs/dump trailers will be sampled for the next 25 treated, then 1 out of 10 for the next 50, and 1 out of 25 for the rest of the remediation which equates to approximately 1 rolloff per day (assuming 15 –30 per day treated). $ 7,762.50
- Multiply by a 10% contingency = $ 776.25
$ 8,538.75

Grinding Stumps – All wood debris that could be shredded was shredded in 1996/1997 with a tub grinder. The few stumps that were left which are in the middle of the pile in CA #1 should be able to be crushed with the demolition head on the trackhoe/longstick. (They have been in a moist environment for a time now) A grinder would not work at this point since it cannot handle the dirt and any rock which enters it will jam the grinder (additional problems that they ran into in 1997). If for some reason the demolition head does not work. A pulverizer head can be rented and attached to the longstick/trackhoe. In the interim, stumps would be staged on poly and bermed to control runon/runoff.

Large item removal – the rock used for the original work in 1996/97 was CA5 which is 2" or less. Some slightly larger material may be incorporated from the base but that was 4" at the most. The landfills can handle up to 12" material. The rock itself is not contaminated, the material on it may be. Therefore, Chemetco does not anticipate any problems with sizing. If a large piece of rock is encountered which the demolition head cannot handle, it will be staged on poly and bermed to control runon/runoff. As stated above, the pulverizer head would be brought in to deal with the rock and any uncooperative stumps. The only other large item would be the pipe itself. The

pipe will be deconned, tested and disposed of as appropriate. Worst case manipulation of the pipe would be that it has to be cut into 2-3 foot sections for disposal as appropriate.

Water Hauling/disposal – Chemetco intends to pull the water out of the containment areas and place it in our scrubber ponds/process water to be utilized as makeup water. The water will be pumped and transported by Chemetco's own equipment/employees. If , worst case, the water had to be taken out and disposed of the numbers are as follows:

CA#1 – 200,000 gallons @ $0.22/gallon =	$ 44,000.00
CA#2 – 275,000 gallons @ $0.22/gallon =	$ 60,500.00
	$104,500.00

Treat and Dispose as Special Waste

Treatment	$ 33.50 ton
Disposal & transportation	$ 21.00 ton
EXCEL Environmental mixing, Equipment, decon	$ 7.85 ton
	$ 62.35 ton

3,022.95 tons x $62.35 ton =	$188,480.93
Sampling & Analysis (left original $) =	$ 13,380.00
Rental of Pulverizer Head/Pipe Disposal	$ 10,000.00
Disposal of water =	$104,000.00
Engineering & Oversight =	$ 5,339.29
	$321,200.22

Select Projects

METALS TREATMENT TECHNOLOGIES

ILLINOIS PROJECT EXPERIENCE				
CNB Technologies, Inc. Illinois (#3083)	Battery Manufacturing	Lead	IEPA	Remediated 30,000 tons of soil in situ and ex situ. Received permission from IEPA to beneficially reuse the stabilized soil on-site through Illinois' Pre-Notice program. Use of RMT's stabilization chemistry and reuse of the soil on-site saved the client about $600,000 as compared to treatment with cement and hauling to a Subtitle D landfill.
N. Chicago Vacant Lot (MACTEC, Inc.) Illinois	Foundry Debris Fill	Lead	IEPA	Provided analytical support during the in situ remediation of approximately 10,000 tons of lead-contaminated soil.
Dutch Boy, Calumet Park, Illinois	Paint Factory	Lead	City of Chicago, IEPA	Assisted with the treatment of over 11,000 tons of lead-impacted soil using a pug mill.
OTHER PROJECT EXPERIENCE				
Riley County Kansas (#4702)	Battery Casings	Lead	KDHE	Provided construction management services for the in situ treatment and stabilization of 3,700 cu. yd. of soil impacted with lead from crushed batteries.
TapperAir Associates, Inc. Tru-Fit Battery Site Iowa (#4870)	Battery Casings	Lead	Region VII	Assisted with treatment of 3,000 tons of lead-impacted soil.
Confidential Client Australia (#3973)	Copper Smelter	Lead, Cadmium, Arsenic, Copper, Selenium, Zinc		Treated over 40,000 tons of smelter sludge. Treatment costs were less than half the cost of hazardous waste disposal.
Confidential Client Indiana (#1468)	Foundry	Lead, Cadmium	IDEM	Treated 69,000 cu. yd. of soil in situ and capped in accord with USEPA and state approval. Resulted in client savings of approximately $15 million.
Globe Valve Corp. Indiana (#1185)	Foundry	Lead	IDEM	Designed waste treatment system with 2-year payback. Treated waste on site. Received 1989 Engineering Excellence Award from Wisconsin Assoc. of Consulting Engineers.
U.S. Environmental Protection Agency Indiana (#3986)	Former Petroleum Manufacturing	Lead, Cadmium	USEPA Region V, IDEM	Remediated 44,000 tons of soil in situ that was impacted with lead and cadmium from petroleum enriching gas.
CWC Castings – Tawas Michigan (#122)	Foundry	Lead, Cadmium		Treated over 45,000 tons of sludge ex situ. Designed new wastewater treatment system to eliminate hazardous sludge generation. New wastewater and hazardous waste system saved the client $3 million in capital expenditures.

METALS TREATMENT TECHNOLOGIES

New Haven Foundry Michigan (#1991)	Foundry	Lead, Cadmium, Zinc	MDEQ	Remediated 12,700 cu. yd. of sediment in situ and an additional 5,200 cu. yd. of waste materials using a pugmill.
Gopher Smelting & Refining Co., Minnesota (#3257)	Smelter	Lead	MPCA	Remediated 2,650 tons of soil in situ. Resulted in significant cost savings as compared to handling the soil as a hazardous waste or compared to other on-site treatment methods
Minneapolis Community Development Agency Blocks 41 and 43 Minnesota (#4375)	Former Scrap Yard	Lead	MPCA	Remediated 6,000 cu. yd. of debris using a pugmill ex situ, and a smaller amount of debris in situ.
U.S. Army Corps of Engineers, Minnesota (#3971)	Residential Neighborhood with Foundry Waste	Lead	USEPA Region V, COE MPCA	Remediated approximately 600 tons of foundry residues in situ with backhoes.
U.S. Environmental Protection Agency Missouri (#4336)	Lead Smelter/ Foundry	Lead	USEPA Region VII, MoDNR	Remediated 7,800 tons of soil in stockpiles ex situ using backhoe mixing. Design optimization reduced chemical usage by 50%.
NIBCO Inc. New York (#2778)	Foundry	Lead, Cadmium	NYSDEC	Treated 6,000 cu. yd of soil. *In situ* treatment was completed with a Mobile Injection Treatment Unit (MITU).
Burnham Foundry Ohio (#2263)	Foundry	Lead, Cadmium	OEPA	Treated 14,000 tons of soil in situ.
Confidential Client Ohio (#20188)	Foundry	Lead	USEPA Region V, OEPA	Remediated 170,000 cu. yd. of sludge in-lake using a continuous hydraulic dredging system. Removal approval for continued use of the basin throughout the project saving the client $80-100 million compared with other remediation and disposal alternatives.
Confidential Client, Ohio (#2140)	Foundry	Lead	Not Applicable	Stabilized 41,000 tons of settling basin waste underwater using a dragline.
C and E Battery Virginia (#70046)	Battery Recycling	Lead	USEPA	Remediated 30,000 cu. yd. of soil in situ. Saved the PRP group $300,000 compared to alternative technologies.
City of Wisconsin Rapids, Wisconsin (#10351)	Scrap Yard	Lead	WDNR	Remediated 3,500 cu. yd. of soil in situ. Resulted in cost savings of over 75 percent compared to alternatives.
U.S Environmental Protection Agency Wisconsin (#4290)	Shooting Range	Lead	USEPA Region V, WDNR	Remediated 500 tons of soil in situ using backhoes and roll-off containers.
Wausau Steel Wisconsin (#3929)	Battery and Scrap Recycling	Lead	WDNR	Treated 3,000 cu. yd. of material in situ and consolidated on-site within 100-year flood plain. Used SPLP to demonstrate groundwater protection.

Select Projects

METALS TREATMENT TECHNOLOGIES

Wisconsin Department of Transportation (#10249)	Bridge Reconstruction Site	Lead	WDNR	Remediated over 500 tons of sediments to an underwater within a million days in a navigable waterway.
Wisconsin Dept. of Natural Resources (#10068)	Orchards	Lead, Arsenic	WDNR	Remediated soil in situ at apple and cherry orchards.
Wisconsin Dept. of Transportation (#10001)	Former Battery Cracking Facility	Lead	WDNR	Remediated 55,000 cu. yd. of battery containing residue in situ using conventional construction equipment, excluding waste material below the water table. Demonstrated groundwater protection, and left the treated material on-site.
City of Edina Shooting Range, Minnesota (#4713)	Shooting Range	Lead	MPCA	Treated approximately 2,000 cubic yards of soil in stockpiles on site with bucklers. Treated material was left on-site.
City of Wausau - Bapf Street, Wisconsin (#4363)	Foundry Waste	Lead	WDNR	Remediated 1,200 cubic yards of material in situ on slope, then regraded to 3:1 and left on-site.
Texas Polymer Texas	Plastic Flower Pots	Lead	TNRCC	A fire resulted in 2,000 cubic yards of melted flower pots. The material was ground with mechanical equipment, then treated by RMT on site with our MTT.
Marina Cliffs Barrel CERCLIS Site Wisconsin (#3949)	Former Barrel Cleaning and Reconditioning	Chromium	USEPA Region V; WDNR	Reduced TCLP-chromium from hazardous limits to near the detection limits. Stockpiled waste pit soil had been previously treated with cement to address other metals of concern. Treated 900 tons of soil in situ that had a pH of 12.
Automobile Parts Manufacturer Indiana (#80089)	Chrome Plating and Metals Manufacturing	Chromium	IDEM	Remediated approximately 9,000 tons of soil in situ. Reduced the chromium to an unstable form, which avoided RCRA hazardous waste permitting requirements. Resulted in cost savings of approximately $600,000 compared to traditional excavation alternatives.
Automobile Parts Manufacturer Indiana (#80126)	Chrome Plating and Metals Manufacturing	Chromium	IDEM	Remediated residual chromium-impacted soil adjacent to building foundation at site. Thirty-seven tons of chemicals were mixed with the first four feet of soil. Chromium was no longer detectable in the groundwater after approximately 150 days of treatment.
GNB Technologies, Inc. Georgia (#70565)	Former Battery Manufacturer	Lead, Cadmium, Chromium	GA EPD	Stabilized 10,000 cubic yards of contaminated soil in situ at a former battery manufacturing facility, now an operating chemical plant.
Twin Cities Army Ammunition Plant Minnesota (#4761)	Munitions Manufacturing	Arsenic, Barium, Lead	COE	Provided analytical support during the in situ remediation of approximately 5,000 tons of lead-contaminated soil.

METALS TREATMENT TECHNOLOGIES

Philadelphia Tennessee (#4855)	Nuclear Weapons Manufacturing	Lead, Cadmium, Chromium	NRC	Provided analytical and chemical support to treat approximately 300 tons of low-level radioactive electric arc furnace dust in containers.
Texas Tempered Glass Texas (#4798)	Glass Manufacturing	Lead	TNRCC	Remediated ~1,000 cu. yd. of lead-impacted soil on site
Columbia Development Corp. South Carolina (#4820)	Former Scrap Dealer	Lead	SCDHEC	Remediated over 500 tons of lead-impacted soil on site in a 2-week time frame.
Mid-America Refinery Co. Kansas	Petroleum Refining	Lead	USEPA, Region VII	Assisted with the on site treatment of approximately 20,000 tons of lead-impacted soil
Home Depot (Future Site) Pennsylvania (#4761)	Former Shooting Range	Lead	PADEP	Remediated approximately 400 cu. yd. of lead-impacted soil in situ.
Spectrum Company Delaware (#4811)	Foundry Sand	Lead	DNREC	Remediated approximately 1,100 cu. yd. of lead-impacted soil in situ.
Riley County Kansas (#4742)	Bounty Casings	Lead	KDHE	Provided construction management services for the on site treatment and stabilization of 3,700 cu. yd. of soil impacted with lead from crushed batteries.
Hennepin County Shooting Range Minnesota (#4961)	Former Shooting Range	Lead	MPCA	Assisted with the in situ remediation of lead-impacted soil.
CET Environmental, Fresno Drum Site California (#00189)	Reclaimed Scrap Steel	Lead	CAEPA	Remediated 1,700 cu. yd. of soil in situ and rendered it non-hazardous to meet the California "wet test" criteria.
Cavet Environmental Services, Brainerd Site Minnesota (#3971)		Lead	COE	Provided chemical and technical support for in situ lead stabilization.

ARMSTRONG, TEASDALE, SCHLAFLY & DAVIS

Attorneys and Counselors
One Metropolitan Square
St. Louis, Missouri 63102-2740
(314) 621-5070
Telecopier (314) 621-5065

DATE: 4/11/00 *TIME:*

PLEASE DELIVER TO:

NAME: Tom Martin

FIRM:

ADDRESS:

BUSINESS TELEPHONE:

FACSIMILE TELEPHONE: 312-886-0747

FROM: George M. von Stamwitz

TOTAL PAGES INCLUDING THIS PAGE:

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and ASK FOR EXTENSION 7975.

RE:

INTERNAL USE:

CLIENT-MATTER NUMBER: 11378/001

TELECOPIER OPERATOR: Robbie Heitman

ARMSTRONG TEASDALE LLP

Attorneys at Law

George M. von Stamwitz
(314) 342-8017
gvonstam@armstrongteasdale.com

One Metropolitan Square, Suite 2600
St. Louis, Missouri 63102-2740
Phone: (314) 621-5070
Fax: (314) 621-5065
www.armstrongteasdale.com

April 5, 2000

VIA FAX AND REGULAR MAIL

James Morgan, Esq.
Assistant Attorney General
Environmental Control Division
500 South Second St.
Springfield, IL 62706

RE: Consent Order for Zinc Oxide Release Area and Brick/Debris Area

Dear Jim:

This letter will respond to yours of March 29, 2000 and set forth Chemetco's proposal.

Chemetco will agree to a Consent Order in State court to be filed on or before April 30, 2000 that contains the following terms and conditions:

1. Chemetco will waive the treatment option and complete the physical removal and off-site treatment and disposal of the refractory brick storage/disposal area by June 15, 2000. Chemetco will submit a closure plan together with a sampling and analysis plan to address residuals, if any, by July 15, 2000;

2. The approved RAPP will be attached to the Consent Order. On or before April 30, Chemetco will place in a trust account financial assurance for treatment, physical removal, transportation and disposal of the zinc oxide within Containment Area 1. A summary of the costs is attached to this letter. If the RAPP is modified as a result of the public comment process, Chemetco will post any additional financial assurance to address the changes. The State would agree that Chemetco can pay down this financial assurance as the project progresses.

3. At the conclusion of the investigation into the release area (for which financial assurance is already in place) Chemetco will post financial assurance for the treatment, removal and disposal of residuals, if any.

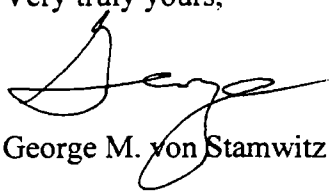
4. With the brick area off the site and financial assurance posted for the known contamination at the release area, Chemetco does not think it is reasonable to be

penalized if for some reason beyond Chemetco's control the RAPP cannot be implemented by October 1. Chemetco proposes an October 1 deadline that includes typical consent order language for force majeure and modification. Chemetco has absolutely no intent or incentive for delay.

5. Chemetco would agree that IEPA could access the financial assurance and perform the work in Containment Area 1 if it is not performed by the deadline or for any other reason set forth in the financial assurance regulations.

We look forward to speaking with you regarding these issues on Friday, April 7th, at 10:00 a.m.

Very truly yours,



George M. von Stamwitz

cc: Kim Fock
Heather Young
Christopher Perzan
Greg Sukys
Tom Martin
Jeff Trevino

Release Area Cost Estimates
Containment Area #1 Only

Estimates of material ***currently in Containment Area #1 (CA 1) only*** which consists of zinc oxide, dirt, rock, shredded wood, and stumps are as follows:

Rock – 280 cubic yards x 2 conv. factor =	560 tons
Zinc Oxide/Dirt – 1625 cubic yards x 1.41 conv. factor=	2291.25 tons
Shredded wood & Stumps –	
202 cubic yards x 0.85 conv. factor=	171.70 tons
	3022.95 tons

Treat and Dispose as Special Waste

Treatment	$ 33.50 ton
Disposal & transportation	$ 21.00 ton
EXCEL Environmental mixing,	
Equipment, decon	$ 7.85 ton
	$ 62.35 ton

3,022.95 tons x $62.35 ton =	$188,480.93
Sampling & Analysis =	$ 13,380.00
Engineering & Oversight =	$ 5,339.29
	$207,200.22

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 W. JACKSON BOULEVARD
CHICAGO, ILLINOIS 60604

WC-15J

DATE: July 2, 1998

FROM: William K. Tong, Environmental Scientist
Water Enforcement & Compliance Assurance Branch
Section 2, WC-15J

TO: Thomas Martin, Attorney
Office of Regional Counsel, C-13J

SUBJECT: Review of preliminary results of May 28, 1998 EPA sampling at Chemetco site

Per your request, I have compared the preliminary surface water and sediment data from the RCRA data set collected from the Chemetco site with EPA surface water quality criteria, and with 1977 EPA Great Lakes sediment dredging guidelines, respectively. The complete EPA Clean Water Act §304 criteria chart (included as an attachment) established chemical-specific values for the protection of aquatic life and human health, based upon acute and chronic toxicity studies. EPA has not yet established comprehensive sediment criteria except for a handful of polyaromatic hydrocarbon (PAH) compounds; therefore, Region 5 guideline numbers published in 1977 were used for comparison, as referenced in the EPA Region 5 document, "Guidelines for the Pollutional Classification of Great Lakes Harbor Sediments."

cc: Pat Kuefler, DRE-9J
Jim Filippini, WC-15J
Cassandra Rice, HQ-OECA

The preliminary results for heavy metals in the sediment samples from the Chemetco site may be compared with the following chart:

U.S. EPA Region 5 Great Lakes Sediment Classification Guidelines (1977) *(All values in mg/kg)*				
Substance	**non-polluted**	**polluted**	**moderately polluted**	**heavily polluted**
Cadmium	*	-	*	>6
Chromium	<25	-	25 - 75	75
Lead	<40	-	40 - 60	>60
Mercury	-	≥ 1	-	-

*No lower limit was established

All of the cadmium and lead samples from the sediments exceed the "heavily polluted" classification, as did Sample SD-07 for chromium and for mercury, as indicated in bold-face in the following table:

Chemetco Preliminary Sample Results: Sediment						
ID	**Method**	**Units**	**Cadmium**	**Chromium**	**Lead**	**Mercury**
SD-01	Total	mg/kg	**566.0**	14.0	**1100**	0.4
SD-02	Total	mg/kg	**308.0**	14.4	**383**	0.3
SD-03	Total	mg/kg	**98.1**	16.4	**652**	0.1
SD-04	Total	mg/kg	**8.7**	18.2	**298**	0.1
SD-05	Total	mg/kg	**7.0**	17.0	**433**	0.1
SD-06	Total	mg/kg	**4.7**	16.7	**80**	0.1
SD-07	Total	mg/kg	**3450.0**	**110.0**	**22600**	**8.5**
SD-08	Total	mg/kg	**8.7**	23.8	**1490**	0.1

Boldfaced-numbers above indicate "heavily polluted" designation under the 1977 EPA Great Lakes Harbor sediment guidelines

As shown on the next page, most of the surface water values exceed federal water quality criteria for most the sampled heavy metals, especially for lead and cadmium.

Selected EPA Clean Water Act §304 Published Surface Water Quality Criteria (as of 7/1/93)					
Priority Pollutant #	*Chemical Name*	Aquatic Life Criteria (values in µg/L)		Human Health Criteria (values in µg/L)	
		Acute Exposure Value	*Chronic Exposure Value*	*Water + Fish*	*Fish*
112	Arsenic	360	190	0.002	0.017
-	Barium	-	-	1000 (MCL)	1000 (MCL)
115	Cadmium	3.9*	1.1*	29	-
116	Chromium III Chromium VI	1700 16	210 11	170000 50 (MCL)	3433000 -
119	Lead	82*	3.2*	-	-
120	Mercury	2.4	0.012	0.144	0.146
122	Selenium	20	5	10 (MCL)	-
123	Silver	4.1*	-	50 (MCL)	-

* = value dependent upon hardness of water

MCL = maximum contaminant level, used under the Safe Drinking Water Act to protect public water supplies

Chemetco Preliminary Sample Results: Surface Water										
ID	**Method**	**Units**	**Arsenic**	**Barium**	**Cadmium**	**Chromium**	**Lead**	**Mercury**	**Selenium**	**Silver**
SW-01	Total	µg/L	<100	83	**12.4**	<10.0	<50.0	<0.20	<100	<5.0
SW-01	Total	µg/L	<100	78	**9.9**	<10.0	<50.0	<0.20	<100	<5.0
SW-03	Total	µg/L	<100	84	**9.4**	<10.0	<50.0	<0.20	<100	<5.0
SW-04	Total	µg/L	<100	**1110**	**467.0**	52.1	**12500**	**1.5**	<100	**16.5**
SW-05	Total	µg/L	<100	154	**54.2**	<10.0	**481**	<0.20	<100	<5.0
SW-06	Total	µg/L	**153.0**	**2150**	**352.0**	104.0	**14600**	**1.8**	**107.0**	**45.1**
SW-07	Total	µg/L	<100	77	**405.0**	12.9	**9040**	**8.3**	**348.0**	<5.0

Boldfaced numbers in the above chart indicate exceedances of surface water quality criteria

From: WILLIAM TONG
To: DCAR01.DCARPO2(RICE-CASSANDRA)
Date: 6/4/98 11:27am
Subject: Chemetco: 1990/6 Permits -Forwarded -Reply

Cassandra,
The Illinois EPA faxed me copies of the fact sheets from Chemetco's 1990 and 1996 permits. Please send me your fax number, so that I can fax them to you. Just in case the fax of a fax renders them illegible, I will send the hard copy to you as well.
-Bill

William K. Tong, Environmental Scientist
Water Enforcement & Compliance Assurance Branch
Asian Pacific Special Emphasis Program Manager
U.S. Environmental Protection Agency - Region 5
Chicago IL, (312) 886-9380
E-mail: tong.william@epa.gov

>>> THOMAS MARTIN 06/01/98 11:08am >>>
Bill please sent the fact sheets to Cassandra
tjm, 6-4273

CC: R5ORC.R5ORC1(MARTIN-THOMAS)

C-334-M-9

Joanne USEPA

CSD Environmental Services, Inc.

September 2, 1997

Illinois Environmental Protection Agency
Bureau of Land #24, Permit Section
1021 North Grand Avenue East
Springfield, IL 62794-9276
Attn: Kevin D. Lesko

RE: 1198010003--Madison County
Chemetco, Inc.
ILD048843809

Dear Mr. Lesko:

This letter has been prepared to inform you of the cleanup objectives being proposed by CSD Environmental Services, Inc. (CSD), on behalf of Chemetco, Inc. (Chemetco), for the zinc oxide spill area.

On August 13, 1997, a hand auger boring (RA-1) was advanced to a depth of four feet at a location approximately forty feet north of MW-9. A soil sample was collected at four feet and sent to Prairie Analytical Systems, Inc. (Prairie), in Springfield, IL, for analysis of pH. This analysis showed that the native soil in the area of the zinc oxide spill has a pH of 8.34. Using 35 IAC Part 742, Appendix B, Table C, *pH Specific Soil Remediation Objectives for Inorganics and Ionizing Organics for the Soil Component of the Groundwater Ingestion Route (Class I Groundwater),* cleanup objectives of 430 mg/kg and 53,000 mg/kg were established for total cadmium and total zinc, respectively. Using Appendix B, Table B, *Tier 1 Soil Remediation Objectives for Industrial/Commercial Properties*, a remediation objective of 400 mg/kg was established for total lead.

In addition to the sample collected from boring RA-1, soil samples were also collected from various locations in Containment Area #4 and sent to Prairie for analysis of total lead, cadmium and zinc. These results were then compared to the cleanup objectives which were established based upon the pH of the native soil. Table 1 summarizes the results of the soil samples collected from Containment Area #4 on August 13, 1997. A map of the area showing the sample locations is provided as Figure 4-1. The results of the laboratory analysis are contained in Attachment 1.

Comparison of the soil sample results from Containment Area #4 with the cleanup objectives being proposed, would indicate that no further remediation is required in the areas from which these samples were collected. CSD, on behalf of Chemetco, is requesting that closure of this portion of the spill area be granted.

PRINTED WITH SOY INK

2220 Yale Blvd., Springfield, IL 62703 • Phone 217-522-4085 • FAX 217-522-4087

Should you have any questions or need additional information, please contact me or Shane Thorpe at 217/522-4085.

Sincerely,

Cindy S. Davis
President

cc: Greg Cotter, Chemetco, Inc.
Chris Cahnovsky, IEPA -Collinsville Office

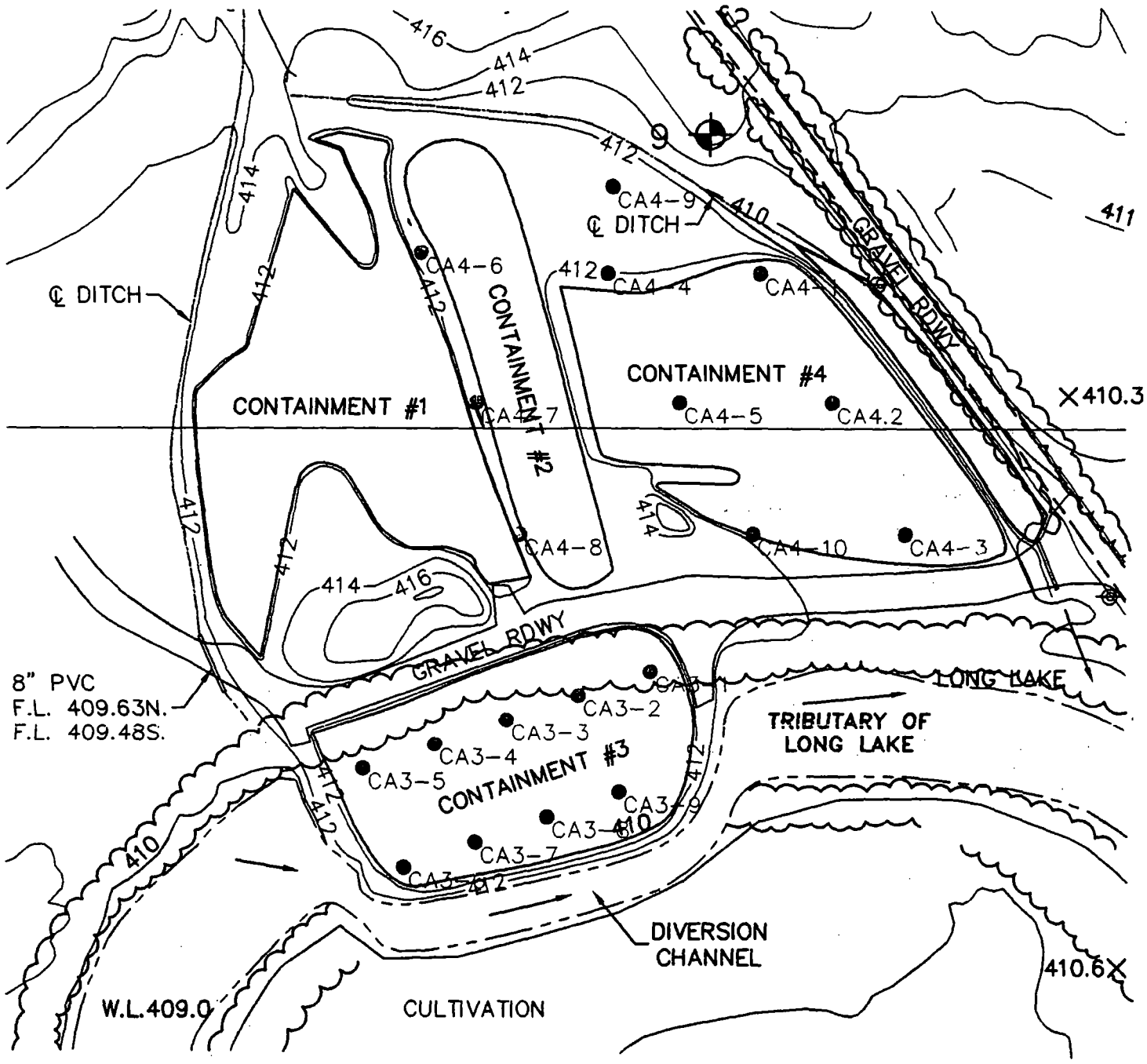
c:\hac\chemetco\cleanup.obj

TABLE 1
CHEMETCO, INC.
Containment Area #4
Soil Sample Results (mg/kg)
8/13/97

Location/Parameter	Total Cd	Total Pb	Total Zn
CA4-1 (6")	2	41	131
CA4-1 (18")	.6	12	56
CA4-2 (6")	5	37	139
CA4-2 (18")	.7	13	41
CA4-3 (6")	10	74	224
CA4-3 (18")	2	17	52
CA4-4 (6")	2	71	207
CA4-4 (18")	1	23	70
CA4-5 (6")	.6	14	57
CA4-5 (18")	1	15	49
CA4-9 (6")	1	28	92
CA4-9 (18")	1	13	57
B-1 (6")	19	217	579
B-1 (18")	6	80	184
B-1 (5')	1	13	49
Remediation Obj.	430[1]	400[2]	53,000[1]

[1]Objective established using 35 IAC Part 742, Appendix B, Table C - pH Specific Soil Remediation Objectives for Inorganics for the Soil Component of the Groundwater Ingestion Route (Class I)

[2]A preliminary remediation goal of 400 mg/kg has been set for lead based on *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities*, OSWER Directive #9355.4-12



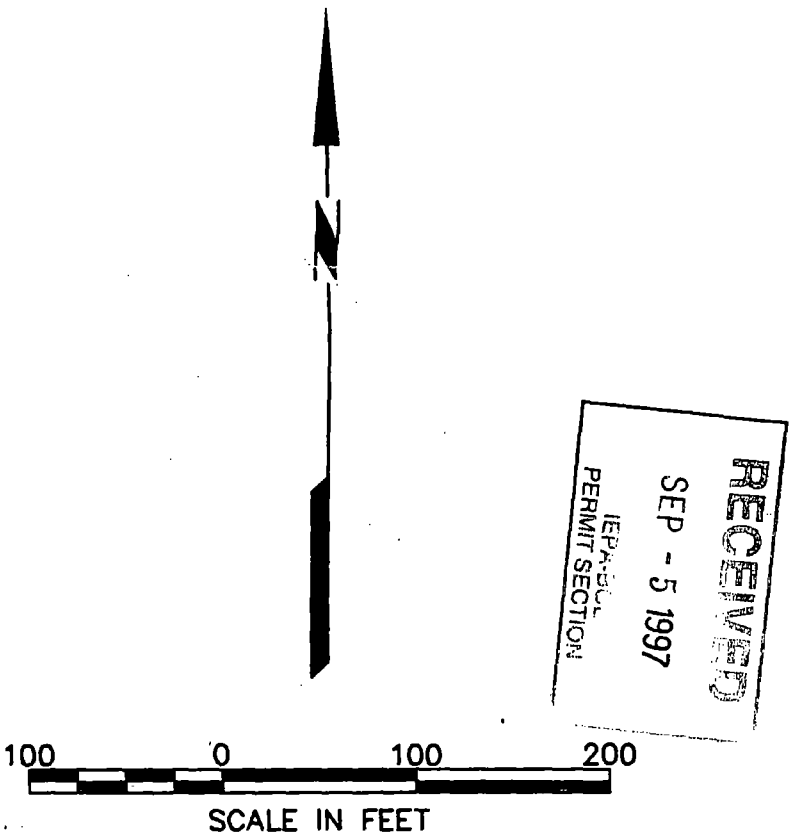


FIGURE 4-1
SAMPLE LOCATIONS
CONTAINMENT AREAS 3 & 4

CHEMETCO P.O. BOX 67 · HARTFORD, ILLINOIS 62048
1-800-254-4381

ZINC OXIDE SPILL REMEDIATION PLAN
APRIL, 1997

CSD Environmental Services, Inc.
2220 Yale Blvd.
Springfield, Illinois 62703
217/522-4065

SMS ENGINEERS
Sheppard Morgan & Schwaab, Inc.
CONSULTING ENGINEERS & LAND SURVEYORS
215 Market Street
P.O. BOX E
Alton, Illinois 62002
618/462-6755
10 Central Industrial Dr
Northgate Center
Granite City, IL 62040
618/877-6700

Chain of Custody Record

AUG 2 0 1997

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD Environmental Services	Project	Cnemetco
Address	2220 Yale Blvd	Contact Person	Cindy Davis
City, State, Zip	Springfield, IL 62703	P. O. #/ Invoice to:	
Phone Number	217/522-4085	Facsimile Number	217/522-4087

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling		Container		Preservative	Analysis Requested	PAS Sample Number
		Date	Time	Size	No.			
CA4-2 (6")	Soil	8/13	PM	1	4oz		Total Pb, Cd, Zn	4442
CA4-2 (18")								4443
CA4-1 (6")								4444
CA4-1 (18")								4445
CA4-3 (6")								4446
CA4-3 (18")								4447
CA4-4 (6")								4448
CA4-4 (18")								4449
CA4-5 (6")								4450
CA4-5 (18")								4451
CA4-9 (6")								4452
CA4-9 (18")								4453

Relinquished by: Shane A Thorpe		Received by: Gary Burk	
Date: 8/14/97	Time: 11:40 AM	Date: 8-14-97	Time: 11:40 am
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-187

Form PASCOC1

Copies: White - Client, Yellow - Lab Receiving, Pink - Retained by Smapler

Chain of Custody Record

AUG 2 0 1997

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD ENVIRONMENTAL SERVICES	Project	CHEMETCO
Address	2220 YALE BLVD.	Contact Person	CINDY DAVIS
City, State, Zip	SPRINGFIELD, IL 62703	P. O. #/ Invoice to:	
Phone Number	217/522-4085	Facsimile Number	217/522-4087

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling		Container		Preservative	Analysis Requested	PAS Sample Number
		Date	Time	Size	No.			
B-1 (6")	SOIL	8/13	AM	1	4oz		TOTAL Pb, Cd, Zn	4454
B-1 (18")								4455
B-1 (5')								4456
RA-1 (4')			PM				pH	4457
CA4-COMP (6")							TCLP RCRA METALS, pH	4458

Relinquished by:	Shane A Thorpe	Received by:	Mary Bunk
Date:	8/14/97	Time:	11:40 AM
Relinquished by:		Received by:	
Date:		Time:	

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-187

Form PASCOC1

Copies: White - Client, Yellow - Lab Receiving, Pink - Retained by Smapler

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 13 August 1997
Date Received: 14 August 1997
Date Analyzed: 18 August 1997
Date Reported: 19 August 1997

AUG 20 1997

Project: Chemetco

PAS Project Code: CSD-187

Sample Description:	CA 4-4(6")	CA 4-4 (18")	CA 4-5(6")
Sample Number:	9708144448	9708144449	9708144450

Total Metals Analysis

Parameters	Detection Limit mg/kg	Result mg/kg	Result mg/kg	Result mg/kg	E.P.A. Method
Cadmium	0.2	2	1	0.6	6010A
Lead	2.0	71	23	14	7421
Zinc	0.10	207	70	57	6010A

Sample Description:	CA 4-5(18")	CA 4-9 (6")	CA 4-9(18")
Sample Number:	9708144451	9708144452	9708144453

Total Metals Analysis

Parameters	Detection Limit mg/kg	Result mg/kg	Result mg/kg	Result mg/kg	E.P.A. Method
Cadmium	0.2	1	1	1	6010A
Lead	2.0	15	28	13	7421
Zinc	0.10	49	92	57	6010A

Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 13 August 1997
Date Received: 14 August 1997
Date Analyzed: 18 August 1997
Date Reported: 19 August 1997

AUG 20 1997

Project: Chemetco

PAS Project Code: CSD-187

Sample Description:	B-1 (6")	B-1 (18")	B-1 (5')
Sample Number:	9708144454	9708144455	9708144456

Total Metals Analysis

Parameters	Detection Limit mg/kg	Result mg/kg	Result mg/kg	Result mg/kg	E.P.A. Method
Cadmium	0.2	19	6	1	6010A
Lead	2.0	217	80	13	7421
Zinc	0.10	579	184	49	6010A

Stephen R. Johnson, Laboratory Director

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

AUG 20 1997

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62702

Date Sampled: 13 August 1997
Date Received: 14 August 1997
Date Analyzed: 18 August 1997
Date Reported: 19 August 1997

Project: Chemetco

PAS Project Code: CSD-187

Sample Description: RA-1 (4')

PAS Sample No.: 9708144457

Inorganic Analysis

Parameters	Detection Limit	Result	E.P.A. Method
pH (Units)	---	8.34	9045

Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 13 August 1997
Date Received: 14 August 1997
Date Analyzed: 18 August 1997
Date Reported: 19 August 1997

AUG 20 1997

Project: Chemetco

PAS Project Code: CSD-187

Sample Description: CA 4-Comp (6")

PAS Sample No.: 9708144458

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	E.P.A. Method	STORET Number	Regulatory Limit mg/l
Arsenic	0.05	<0.05	6010A	99012	5.00
Barium	0.020	0.12	6010A	99014	100.00
Cadmium	0.004	0.10	6010A	99016	1.00
Chromium	0.007	<0.007	6010A	99018	5.00
Lead	0.04	<0.04	6010A	99020	5.00
Mercury	0.0002	0.0025	7470	99022	0.20
Selenium	0.05	<0.05	6010A	99024	1.00
Silver	0.007	<0.007	6010A	99026	5.00

Miscellaneous

Parameters	Detection Limit mg/kg	Result mg/kg	E.P.A. Method	STORET Number	Regulatory Limit mg/kg
pH (Units)	---	7.5	9040A	00400	2.0<pH<12.5

Stephen R. Johnson, Laboratory Director

MEMORANDUM

DATE: November 26, 1996

TO: BOL - Records Unit

FROM: Chris Cahnovsky - Collinsville FOS CrC

SUBJECT: 1198010003 -- Madison County
Chemetco, Inc.
ILD048843809
FOS

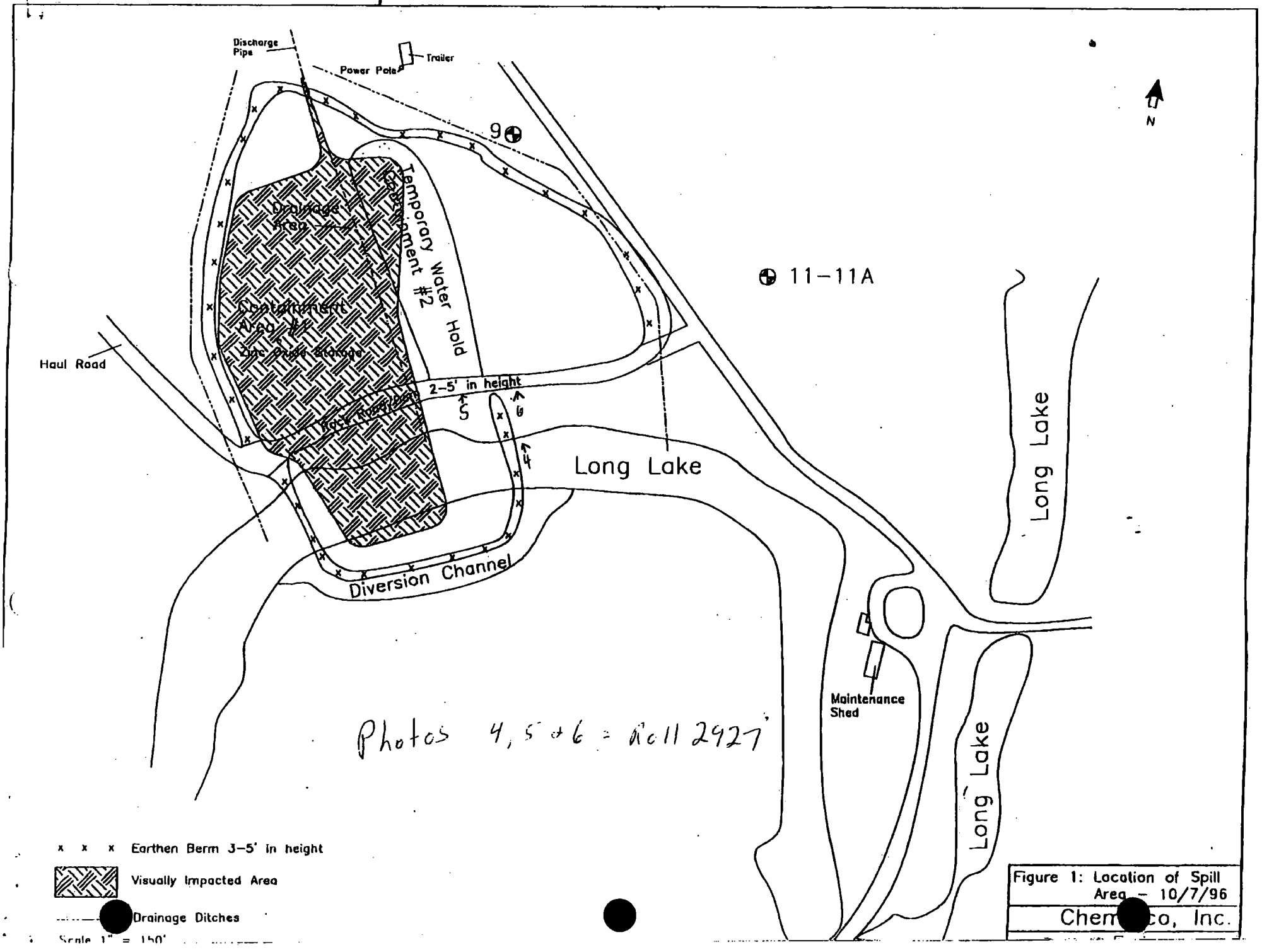
On November 8, 1996 I conducted a site visit at Chemetco, Inc. Present during this site visit was Mr. Greg Cotter. Between the dates of November 6 and November 8, 1996, the Hartford area received about 3.36 inches of rain. I visited Chemetco to observe the conditions of the impoundments on the south side of the facility and to observe if they were effected by the heavy rainfall. The impoundments contained large amounts of water. The dike walls of Containment Area #2 appeared to be holding and sufficient freeboard was observed. Mr. Cotter said that he is applying for an NPDES permit to discharge this water to Long Lake.

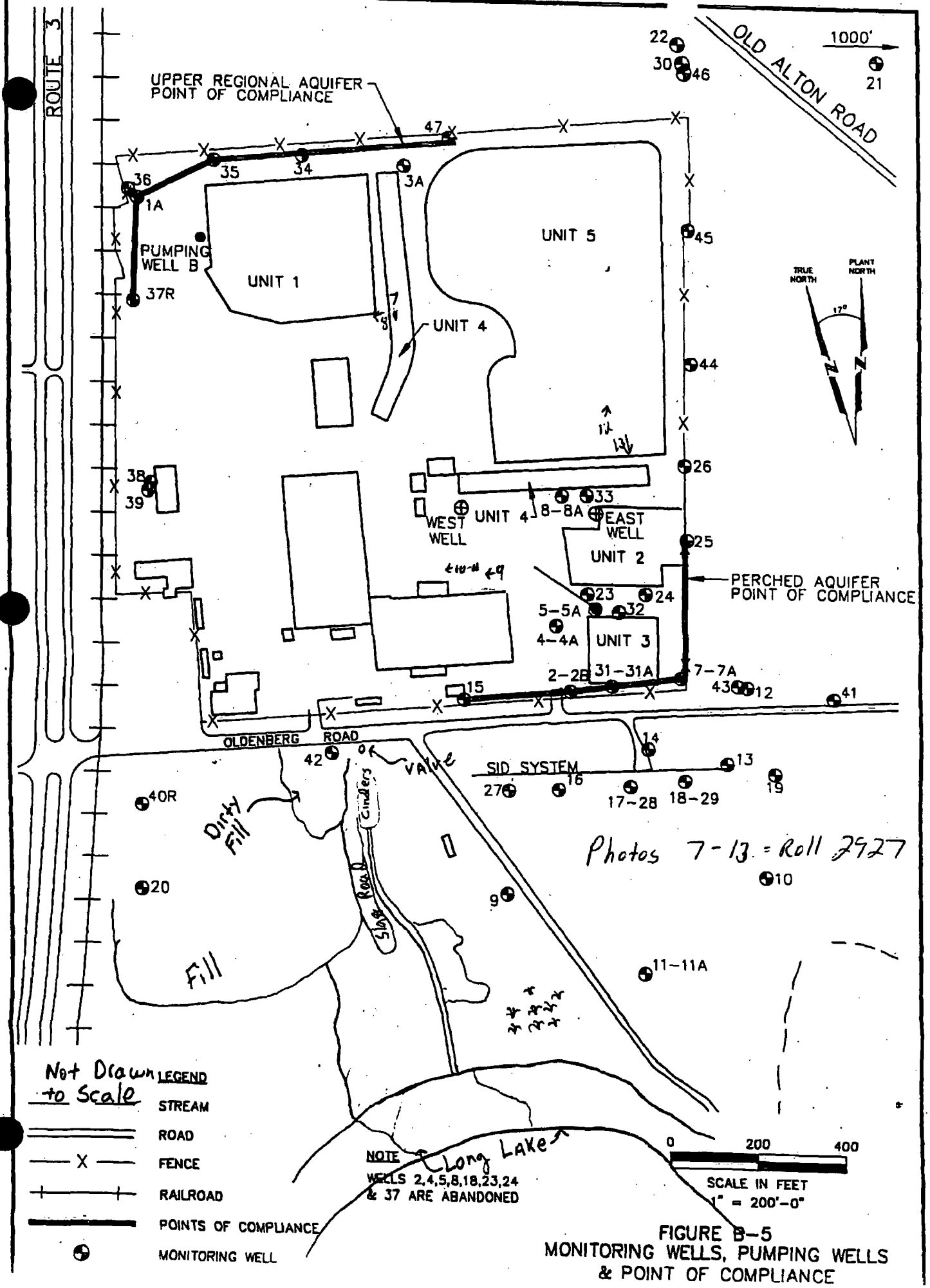
I then requested Mr. Cotter to give me a tour of the plant. I inspected the southeast side of the zinc oxide bunker. During the September 18, 1996 CEI, I observed what appeared to be zinc oxide contaminated water seeping from the bunker. Water from the bunker is still leaking out of the seam between the wall and base of the bunker. This water along with stormwater had overtopped the secondary curbing of the bunker. According to Mr. Cotter, no water was being pumped back to the bunker. He said that the water will be hard piped to the top of the bunker. I told Mr. Cotter that this seep would have to be fixed as soon as possible and not to wait for a letter from the Agency requesting it to be fixed. He said he is going to have the bunker tuck pointed to repair the seep.

We then preceded to the Polishing Ponds. Apparently, the Polishing Ponds had overtopped. Zinc oxide slurry was observed on the concrete around the ponds. Mr. Cotter confirmed that this was zinc oxide slurry. I observed zinc oxide slurry on the west and south side of the ponds. Some zinc oxide slurry was being pumped back into the ponds. Mr. Cotter said what the pumps do not return to the Polishing Pits will be cleaned up.

I observed a large portable pump on the east end of cooling canal that runs east to west. This pump was pumping stormwater from the cooling canal to the slag pile. Mr. Cotter said that the stormwater was being used to cool the slag. I did not observed any hot slag in this area. I did not observe any steam being generated from the cooling of hot slag. This water was being discharged to a flat surface and pooling in a low spot. It is possible that if hot slag would be placed in this pool of water a slag explosion would result.

CNC/CHEM3.MEM
cc: BOL - Collinsville Files ✓
cc: Chris Perzan - DLC


Discharge Pipe
Power Pole
Trailer
9
N
Drainage Area #1
Containment Area #1
Temporary Water Hold Containment #2
11-11A
Haul Road
2-5' in height
5
6
4
Long Lake
Long Lake
Long Lake
Diversion Channel
Maintenance Shed
Photos 4, 5 & 6 = Roll 2927
x x x Earthen Berm 3-5' in height
Visually Impacted Area
Drainage Ditches
Scale 1" = 150'
Figure 1: Location of Spill Area - 10/7/96
Chem Co, Inc.



Photos 7-13 = Roll 2927

FIGURE B-5
MONITORING WELLS, PUMPING WELLS
& POINT OF COMPLIANCE

MEMORANDUM

DATE: November 4, 1996

TO: BOL - Records Unit CRC

FROM: Chris Cahnovsky - Collinsville FOS

SUBJECT: 1198010003 -- Madison County
Chemetco, Inc.
ILD048843809
FOS

On October 24, 1996, Gina Search and I conducted a site visit at the above mentioned site. CSD and Western Environmental were on-site sampling Containment Area #3. I observed CSD take nine soil samples. Three of these samples were taken at five foot depths. The rest of the samples were taken at an 18 inch depth. Zinc oxide was present in many of these samples at levels between six inches and 21/2 feet. I selected the areas where CSD was to obtain the five foot samples. I selected sampling points CA3-3, CA3-4 and CA3-7. The grid in Containment Area #3 had to be adjusted because the grid intervals were to large. Some of the sampling points fell outside of the impoundment.

Samples could not be obtained in Containment Area #1 because the soil conditions were too wet. The grid in Containment Area #3 also had to be adjusted because the grid intervals were to large and some of the sampling points fell outside of the impoundment. I selected three areas in Containment Area #1 to be sampled at a depth of five feet.

CSD has obtained the results of sediment samples taken of Long Lake. According to Cindy Davis, Long Lake is impacted with zinc and lead from the area where the zinc oxide entered the lake to where the culvert runs under the road.

CNC/CHEM2.MEM
cc: BOL - Collinsville Files
cc: Chris Perzan - DLC
cc: Kevin Lesko - BOL Permits

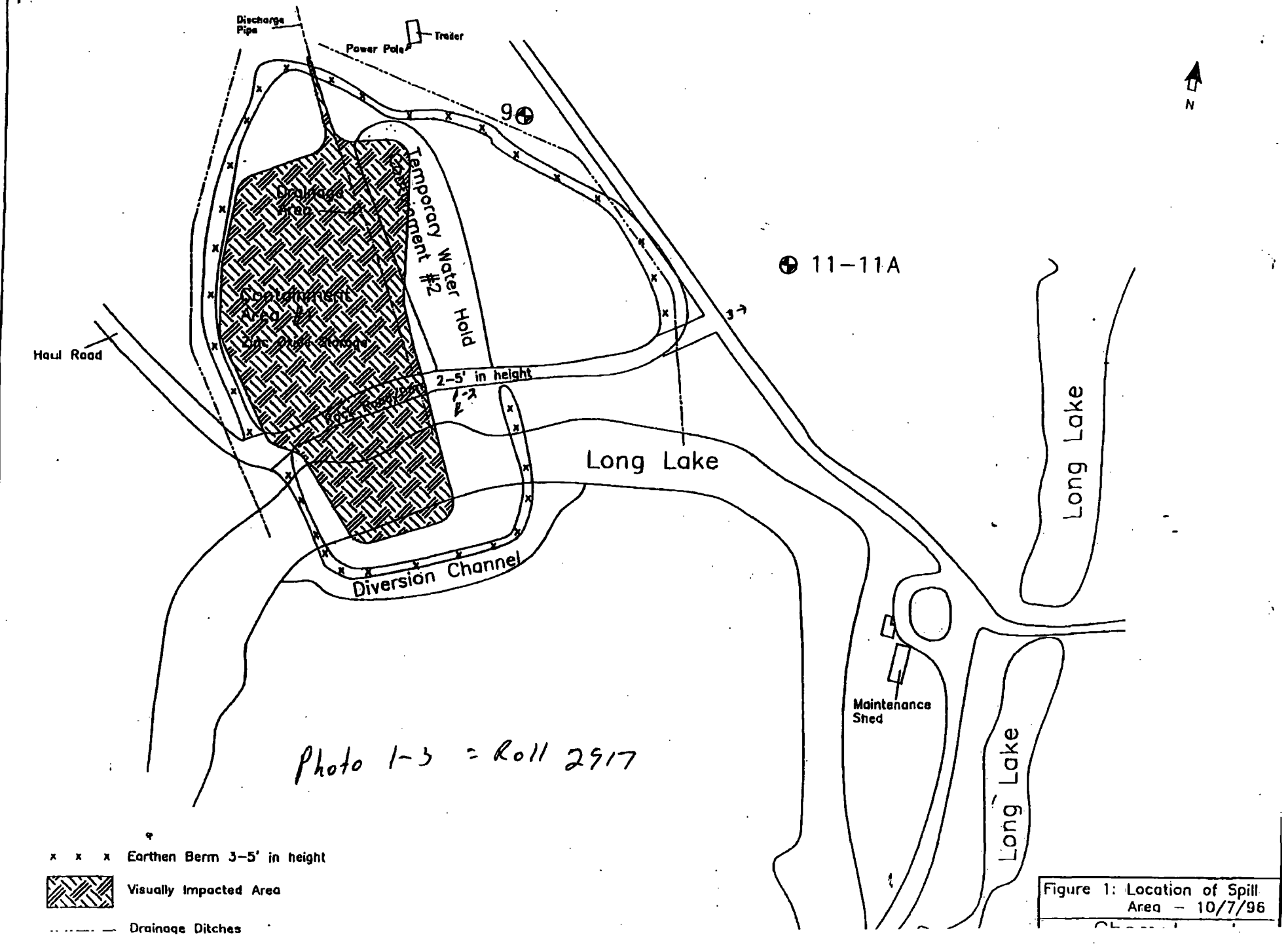


Figure 1: Location of Spill Area – 10/7/96

MEMORANDUM

DATE: October 30, 1996

TO: BOL - Records Unit

FROM: Chris Cahnovsky - Collinsville FOS CNC

SUBJECT: 1198010003 -- Madison County
Chemetco, Inc.
ILD0048843809
FOS

On October 15, 1996, I conducted a site visit at the above-mentioned site. I met with Marc Simmering of CSD Environmental. Since I last visited the site, CSD has removed the work pads from Containment Area #3. Allegedly, the zinc oxide and contaminated soil located under these pads has been moved to Containment Area #1. I observed a large pieces of machinery referred to as the Long Stick removing zinc oxide contaminated soil from Containment Area #3 and placing it in Containment Area #1. Per Mr. Simmering, he took a sample from Containment Area #3 and had it analyzed for TCLP metals. This sample showed lead levels over the regulated limit of 5.0 mg/L. More contaminated soil had to be removed. Mr. Simmering stated that he observed zinc oxide 2 to 2 ½ feet below the surface of the original sediment layer of Long Lake (Containment Area #3). I still saw traces of zinc oxide in Containment Area #3. This containment area was not visually clean. I observed zinc oxide streaks in the bottom of Containment Area #3. The water in Containment Area #3 was a rusty orangish brown color. Mr. Simmering said that the water gets dark this longer it sits in the impoundment.

The zinc oxide waste in Containment Area #1 has been surrounded by an earthen berm. Zinc oxide still remains in Containment Area #1 outside of this berm. I observed a large streak of zinc oxide outside of this berm on the northwest side of the impoundment. I also observed zinc oxide in the ditch along the slag road in Containment Area #1. The water in the ditch was several different colors including red, green, orange and blue. This discoloration could be from metals leaching from the slag. Containment Area #1 was not visually clean. No water has been moved from Containment Area #2 to the plant. Mr. Simmering stated that he did not think that the plant would take any water from this area.

Gina Search and I returned to this site on October 17, 1996. We met with Marc Simmering. CSD on behalf of Chemetco submitted a sampling and analysis plan for the site characterization of the zinc oxide discharge area. The plan and a cover letter sign by Cindy Davis of CSD that stated that all visible zinc oxide has been removed from these areas and placed into Containment Area #1 until the management of the zinc oxide material is resolved. I inspected Containment Area #1, Containment Area #3, and Containment Area #4 and in all three impoundments I observed zinc oxide. These three impoundments were not visually clean.

SCP

According to Mr. Simmering, he observed zinc oxide in layers in Long Lake. From what Mr. Simmering told me it appears that two three layers of zinc oxide were observed in the soil profile. He said that he had to dig down two to three feet in some areas to get to a soil base and not see any more zinc oxide. The depositional layering of zinc oxide and soil would indicate that this was not a one time release. It appears that zinc oxide has been released to this area on several different occasions.

CSD Environmental submitted a work plan for the removal of the zinc oxide on behalf of Chemetco. This work plan titled Work Plan for the Immediate Response to the Zinc Oxide Spill was dated October 10, 1996 and was received by the Agency on October 17, 1996. In this plan Chemetco proposed to send the water in Containment Area #2 back to the plant or discharge the water to Long Lake. Mr. Simmering stated that he did not think that the plant would take any water from this area. Mr. Simmering said he took samples of the water in Containment Area #2 for possible discharge to Long Lake. I asked where in the impoundment he took the sample. He stated it was from the surface. I stated that I did not feel that this sample was sufficient to be able to discharge to Long Lake. I also said that Chemetco would need an NPDES permit to discharge to Long Lake. I told him to contact Nick Mahlandt with the Agency's Bureau of Water.

CNC/CHEM1.MEM
cc: BOL - Collinville Files
cc: Kevin Lesko - BOL Permits Section
cc: Nick Mahlandt - BOW Collinsville
cc: Chris Perzan - DLC

MEMORANDUM

DATE: October 10, 1996

TO: BOL - Records Unit

FROM: Chris Cahnovsky - Collinsville FOS CNC

SUBJECT: 1198010003 -- Madison County
Chemetco, Inc.
ILD0048843809
FOS

On September 24, 1996 Nick Mahlandt with the Bureau of Water and I conducted a site visit at Chemetco, Inc., in Hartford, Illinois. We met with Cindy Davis of CSD Environmental. CSD has completed the construction of the Long Lake diversion canal and the two dams on Long Lake. One dam has been constructed upstream of the zinc oxide discharge and one has been constructed downstream of the discharge. Construction of the rock berm and heavy road were still being conducted. This rock berm and heavy road is being constructed over zinc oxide contaminated soil. The zinc oxide under this road will eventually have to be removed.

A series of drainage channels were constructed to divert stormwater around the impoundment. According to Ms. Davis, the stormwater will be directed to Long Lake. The diversion channel that was constructed on the east side of the zinc oxide discharge area was cut through zinc oxide contaminated soil. The specific area in question is along the east side of the slag road that runs parallel to the blue pipe. Heavy equipment cut through the zinc oxide and mixed it with soil used for the berms. This soil will eventually have to be removed.

During this site visit Nick Mahlandt took several water samples. Sample 30 was taken of Long Lake off of Old Alton road where Franko Road crosses the Lake. This sample was taken about two miles down stream of where the zinc oxide entered the Lake. Sample 31 was taken of Long Lake about 400 feet southwest of the where the zinc oxide entered the Lake. Sample 32 was taken immediately down stream of the where the zinc oxide entered the Lake. Sample 33 was taken of the point where the zinc oxide entered the Lake.

September 25, 1996

I met with Michael Ricketts of the Army Corp of Engineers (COE) St. Louis Office. Mr. Ricketts supplied me with a copy of the permit Chemetco received to divert Long Lake. The permit calls for a plan to return the site to its original conditions once the remediation has been completed. He also wants a letter from the IEPA stating that the cleanup of the zinc oxide slurry discharge was required by the Agency. The COE address is Corp of Engineers Regulatory Branch, 1222 Spruce Street, St. Louis, Missouri 63103.

September 26, 1996

Ken Mensing and I met with Cindy Davis at Chemetco. CSD has apparently nearly completed the construction of the impoundment around the whole site of release. Diversion ditches have been dug around the site to divert stormwater away from the zinc oxide. It appears the impoundments were constructed according to the work plan submitted to the Agency on September 20, 1996. Ms. Davis discussed the feasibility of pumping the water from the Long Lake impoundment to the larger impoundment to the north. The Agency had no objection to this. Ms. Davis said she is having water management problems because of the recent rains. Also, she was planning on sending the water back to the plant to be treated in the Polishing Ponds. Apparently the plant does not have the capacity to handle this water, so it must be stored at the release site until the plant has the capacity to handle it.

Ms. Davis also discussed the possibility of sending the zinc oxide to the Polishing Pits. Her impressions were that the current overseas markets for zinc oxide could not handle this material since it had commingled with soil, water and trees. I stated that since the material was released to the environment in a manner the would constitute disposal, it would be considered a solid waste. The zinc oxide exhibits the hazardous characteristics of lead and cadmium, therefore, it would be considered a hazardous waste. I felt that this waste should not be sent to the Polishing Pits. Ms. Davis commented that the lawyers would have to work that part of it out.

We then discussed the source of the pipe. She said Chemetco is planning on capping the pipe. Apparently Chemetco told her that the pipe was an old stormwater pipe put in before the cooling canals and was part of Chemetco's stormwater system.

September 27, 1996

Cindy Davis called and asked if Chemetco could send the zinc oxide to their on-site filter presses. I said that the Agency would have to review a work plan detailing the process before the Agency could make a decision.

October 7, 1996

I met with Marc Simmering and Greg Cotter at the site. The area of release has been divided into four impoundment. CSD is referring to these impoundments as containment areas. Containment Area #1 is where the pipe was located and the majority of the zinc oxide was discharged. About 6-8 inches of zinc oxide and soil has been bulldozed to the southwest corner of this containment. The zinc oxide contaminated trees and vegetation have been removed from Containment Area #1 and placed in Containment Area #4. I inspected Containment Area #1 and observed that the area the waste scrapped was not visible clean. Zinc oxide remained in the areas that were scrapped. More excavating needs to be done to remove zinc oxide from the containment.

Containment Area #2 is a constructed impoundment being used to hold water. Water from the dewatering of Containment Area #1, Containment Area #3 and Containment Area #4 have been placed in this impoundment. According to Mr. Simmering this water will sent back to the plant. Containment Area #3 is located in Long Lake. The zinc oxide contaminated trees and vegetation have been removed from Long Lake and placed in Containment Area #4. Two rock work pads have been constructed in Containment Area #3. From these pads heavey equipment will remove zinc oxide and contaminated soil and move this waste to Containment Area #1. At this time, no excavated waste has been moved from Containment Area #3 to Containment Area #1. Visible zinc oxide remain in Containment Area #3. Containment Area #4 is the low area east of the main zinc oxide release area. Containment Area #4 received zinc oxide from the 10 inch metal discharge pipe. Zinc oxide contaminated trees and vegetation have been placed in this impoundment. Some have been shredded. According to Mr. Cotter, no zinc oxide has been taken back to the plant.

October 9, 1996

I had a telephone conversation with Cindy Davis. Apparently, Chemetco told her that when the present stormwater system was built, Chemetco shut off the valve on the 10 inch pipe. This pipe was apparently used to store stormwater and through time, heavy equipment on Odenberg Road and water pressure the valve worked open and released the zinc oxide slurry to Long Lake.

October 10, 1996

Nick Mahlandt and I had a follow-up phone conversation with Cindy Davis. Ms. Davis said that Chemetco told her that this pipe was the stormwater discharge before the existing stormwater system was built. Chemetco believes this is the only 10 inch pipe in the plant and it may lead to the cooling water canals. Apparently from what Chemetco told Cindy Davis, the pipe was connected to the stormwater system that was in place before the closed loop system was installed (see attached permits for the closed loop system).

Later the same day, I met with Marc Simmering on-site. Waste from Containment Area #3 was being placed in Containment Area #1. Mr. Simmering stated that he capped the discharge pipe early last week. I observed that the pipe had been capped. CSD and Western Environmental are planning on demobilizing next week if a decision can not be reached on what to do with the zinc oxide in the impoundments.

CNC
cc: BOL - Collinville Files
cc: Kevin Lesko - BOL Permits Section
cc: Nick Mahlandt - BOW Collinsville
cc: Chris Perzan - DLC

CSD Environmental Services, Inc.

October 15, 1996

Illinois Environmental Protection Agency
Field Operations
Bureau of Land
2009 Mall Street
Collinsville, IL 62234

RE: 1198010003—Madison County
Chemetco, Inc.
ILD048843809
FOS

Attention: Mr. Kenneth G. Mensing
Regional Manager

Dear Mr. Mensing:

Enclosed please find three (3) copies of the *Revised Work Plan for the Immediate Response to the Zinc Oxide Spill* at Chemetco. The Revised Work Plan addresses the comments provided by the Illinois Environmental Protection Agency (IEPA) on September 30, 1996. The IEPA comments are listed below as well as Chemetco's response.

1. **Chemetco must submit as-built scaled drawings of the impoundment area to the Agency.**

Figures 1 and 2 show to a scale of 1" = 150' the spill area and the containment areas.

2. **Chemetco must submit a new work plan containing a detailed description of the decontamination protocol at this site. The plan must include methods for disposal for decontamination of waste.**

A revised work plan is submitted under this cover addressing decontamination protocol and disposal methods.

3. **Inspections of the surface impoundment pursuant to 35 IL Adm. Code 724.115 and 724.326 must be conducted on a daily basis. Chemetco must have contingencies in place to respond to detections of leaks in the impoundment.**

The spill area has been divided into four separate containment areas. Daily inspections for freeboard and erosion will be conducted. Inspection records will be maintained at the facility. In case of leakage from one of the containment areas, the smaller containment areas were constructed within the original larger containment area. In the event one berm of the smaller areas is breached, a larger area will contain the material until the berm can be repaired.

2220 Yale Blvd., Springfield, IL 62703 · Phone 217-522-4085 · FAX 217-522-4087

4. **To avoid making another regulated unit during clean-up, it is recommended that you obtain any necessary permits for waste disposal prior to initiating excavation activities. If it is necessary to store excavated soil and zinc oxide slurry waste on-site prior to disposal, do so only in containers or tanks for less than ninety days. Do not create regulated waste piles by storing hazardous waste in piles. The ninety (90) day accumulation time exemption (35 IAC 722.134) only applies to containers and tanks.**

No additional regulated units will be created during the removal and containment of the zinc oxide. It was necessary to separate the water from the zinc oxide, store the shredded vegetation, and stockpile contaminated limestone rock by creating smaller containment areas within the larger containment. However, no new units were created during this process since the entire larger containment area will undergo closure.

5. **Prevent further releases by capping the end of the 10 inch discharge pipe. Also locate the source of the discharge and insure that there are no further releases.**

The 10 inch pipe was sealed with a 10" PVC cap approximately 50' south of where is crosses Oldenberg Road. The valve on the south side of Oldenberg Road has been shut off. The pipe and valve will be removed up to the south side of Oldenberg Road and a permanent seal installed to prevent any further releases.

6. **The June 30, 1988 consent Order filed in the Circuit Court for the Third Judicial Circuit Madison County, Illinois states that zinc oxide that is placed on the land is not exempt from the requirements of the RCRA or State special waste requirements. Since the zinc oxide slurry discharge to the impoundment is characteristically hazardous for lead and cadmium, it must be managed as a hazardous waste. The waste removed from the impoundment must be sent to a facility with a USEPA Identification Number and must be permitted to accept the waste.**

Chemetco has characterized the spilled material and determined it is zinc oxide. Chemetco agrees if the material were to be left in the spill area, i.e. disposed, it would need to be managed as a hazardous waste. However, since the material can be recycled for further metal reclamation, as is the current zinc oxide produced, the material does not meet the definition of a solid waste under 35 Ill. Adm. Code, Part 721. Specifically, 721.102(e) states materials are not solid wastes when recycled if they can be returned to the original process from which they are generated, without first being reclaimed. The spilled zinc oxide can be sold to existing customers without further reclamation. The spilled zinc oxide has been secured and contained to prevent any further releases to the environment until this issue is resolved. Chemetco acknowledges the apparent disagreement regarding the management of the zinc oxide and is willing to work with the Agency towards resolution of this issue and has initiated discussions with the Illinois Attorney General's Office regarding the 1988 Consent Order.

7. **A detailed description of the dewatering process of the zinc oxide slurry in Chemetco's on-site filter presses must be submitted to the Agency before any dewatering takes place. This plan must include but not be limited to the following:**

   a) **Identify the cells which will be dedicated to the management of hazardous waste;**

b) **Describe the flow of waste through the dewatering process;**

c) **Provide a detailed description of how Chemetco will prevent the mixing of the current generation of zinc oxide with the zinc oxide removed from the impoundment. Chemetco must not mix the hazardous waste zinc oxide removed from the impoundment with the zinc oxide generated elsewhere in the plant;**

d) **All accumulation of the zinc oxide slurry must be done in containers or tanks in compliance with 35 IAC 722.134 and 728.**

At the current time, Chemetco is not anticipating using the on-site filter presses to dewater the zinc oxide. Instead the zinc oxide, will be dewatered by adding a drying agent such as lime in the field prior to loading into trucks. If in the event, Chemetco decides to use the on-site filter presses, the information requested above by the Agency will be submitted prior to the use of the tanks and presses.

8. **The Illinois Environmental Protection Agency must be contacted at 618/346-5120 two (2) days prior to sending any waste to the on-site filter presses or associated tanks for dewatering.**

The IEPA will be contacted two days prior to conducting any dewatering and/or shipment of the zinc oxide material.

9. **The Agency must inspect each cell prior to receiving any hazardous zinc oxide waste.**

See response to Item #7 above.

I trust this information along with the Revised Work Plan addresses all of the Agency's comments raised in the September 30, 1996 letter. If you have any questions please feel free to contact me at the number below.

Sincerely,

Cindy S. Davis
President

cc: Greg Cotter, Chemetco
George von Stamwitz, Armstrong, Teasdale, Schlafly and Davis
IEPA - Emergency Response Unit

CSD Environmental Services, Inc.

CHEMETCO, INC.
WORK PLAN FOR THE IMMEDIATE RESPONSE TO ZINC OXIDE SPILL
Revised October 10, 1996

Prepared by:

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

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FIGURES

ATTACHMENTS

CHEMETCO, INC.
WORK PLAN FOR THE IMMEDIATE RESPONSE TO ZINC OXIDE SPILL
SEPTEMBER 25, 1996
Revised October 10, 1996

Prepared by: CSD ENVIRONMENTAL SERVICES, INC.
2220 Yale Boulevard
Springfield, IL 62703
217/522-4085
217/522-4087 (fax)

INTRODUCTION

An apparent spill of zinc oxide material was reported to the National Response Center and Illinois Emergency Management Agency on September 19, 1996. The spill was found during a routine RCRA Inspection conducted by the IEPA on September 18, 1996. Personnel from the United States Environmental Protection Agency (USEPA) were also present during the inspection. During the inspection, material that appeared to be zinc oxide was discharging from a pipe located south of Old Oldenberg Road. The IEPA and Chemetco, Inc. (Chemetco) collected samples of the water and of the sediment. Three sediment samples and one water sample were collected. Chemetco's samples were shipped to Environmental Analysis on the afternoon of September 18, 1996. Analysis was requested for total lead, cadmium, and zinc and TCLP on lead, cadmium and zinc. Sample results were received by Chemetco on September 27, 1996. Copies of the analytical results are provided as Attachment 1 to this work plan.

To ensure further releases from the pipe do not occur, a PVC plastic cap was temporarily placed over the end of the discharge pipe. The valve on the south side of Oldenberg Road has been shut off. The pipe and valve will be removed up to the south side of Oldenberg Road and a permanent seal installed to prevent any further releases.

This work plan addresses the temporary containment and removal of the apparent zinc oxide material. CSD Environmental Services, Inc. (CSD) has confirmed the release is confined to Chemetco's property. The work plan will be carried out in three phases. The first phase will focus on containment, the second phase will focus on dewatering of the area, and the final phase will be removal of the zinc oxide. A separate plan will be submitted proposing sampling locations, parameters, etc., for the closure of the incident.

PHASE I - CONTAINMENT

Initially a diversion channel was constructed to reroute the lake past the spill area. A Section 404 Permit, of the Clean Water Act (CWA), was required by the Army Corp of Engineers (Corps) to reroute the lake. A permit application was faxed to the Corps on Friday, September 20, 1996 with a request to begin construction on Saturday, September 21. The application consisted of a drawing Figure 1 showing the impacted area, the location of all proposed dams, and the diversion channel.

The following steps were conducted to achieve containment:

1. A road was constructed from the west side of the private lane to the west dam (see Figure 1 attached). This road was constructed using limestone rock. The road started at a height of about 2 feet at the private lane and gradually increased to about 5 feet at the west dam. The total length of this road was about 300 feet. Later the road was extended to intercept the south portion of the truck parking lot. This allows heavy equipment and trucks to enter the spill area without backing up. This will expedite the dewatering and removal of the zinc oxide material. This road is called the rock road/dam.

2. The north side of the rock road/dam was lined with 8 to 10 millimeter thickness polyethylene plastic to inhibit water from flowing under and reaching Long Lake. Limestone rock, was placed on top of the liner to hold it in place.

3. An earthen berm was constructed approximately 3 to 5 feet in height around the entire perimeter of the spill area. A drainage ditch was constructed to divert surface water to Long Lake around the impacted area.

4. A diversion channel 25 feet wide by 3 to 5 feet in depth was constructed to reroute water in Long Lake around the spill area.

5. Two dams were constructed on Long Lake to help in the diversion. The east dam is approximately 10 to 12 feet wide. The west dam is approximately 15 feet wide. Clean soil from the construction of the diversion channel was used to construct the dams.

PHASE II-DEWATERING

To separate the water and zinc oxide and allow heavy equipment access, two new berms within the containment area were necessary. Two containment areas were made, Containment Area #1 for storage of zinc oxide and Containment Area #2 for water. Refer to Figure 2 for the location of the containment areas. The containment areas will be inspected daily to monitor freeboard levels and erosion. Inspection records will be maintained at the facility. The smaller containment areas are constructed within the larger containment. In the event one berm of the smaller areas is breached, a larger area will contain the material.

Zinc oxide was pushed by a bulldozer into Containment Area #1 to allow construction of Area #2. Water was removed from Long Lake and the southwest corner of Containment Area #1 by excavating holes and placing a slotted 55 gallon drums in each. The purpose of the drums was to prevent solids from reaching the portable pumps used to transfer the water into Containment Area #2.

PHASE III-REMOVAL

Zinc oxide will be removed from Containment Area #3 - Long Lake first, followed by either Containment Area #1 or 2. Containment Area #4 does not contain any visible zinc oxide. Refer to Figure 2 for the location of the containment areas.

A. CONTAINMENT AREA #1

Zinc oxide will be removed by either pumping it to the southwest corner of Containment Area #1 or mixing it with a drying agent to enable excavation. A decision on the type of removal will be made based upon the moisture content of the zinc oxide material and economic and environmental considerations. The two processes are described below.

1. Slurry Method - The zinc oxide will be collected in a sump. The sump will have a screen placed over it to screen out foreign objects such as trees, roots, etc. The slurry will be handled in one of the following manners:

   a. The slurry will be placed in a tanker truck and transported to Chemetco's plant. The slurry will be directly unloaded into a tank to separate the water and zinc oxide. The slurry will be routed to a filter press for further dewatering. The decanted water will be routed to the polish pits and used for cooling tower make up water. The filter cake will be sold for further reclamation.

   b. The slurry will be pumped into a temporary tank and filter press set up at the containment area. Filter cake will be loaded into a roll off box and water will be routed back to Containment Area #2 for further handling as identified in Item a above. The filter cake will be sold for further reclamation

2. Use of a drying agent - "Code L Lime", a special type of lime used by the Illinois Department of Transportation for dewatering purposes, will be mixed with the zinc oxide to remove moisture. Once the material to passes the paint filter test it will be transported for further reclamation. An MSDS sheet for "Code L Lime" is provided as Attachment 2. A test was conducted on Friday, October 4, 1996 to determine if "Code L Lime" is an effective drying agent. Two yards of "Code L Lime" was mixed with approximately 10 yards of zinc oxide in Containment Area #2. The "Code L Lime" was proved effective in reducing the moisture in the zinc oxide.

   A field pilot test was also conducted to determine the best drying agent for reducing the leachability of lead and cadmium in zinc oxide. Further treatment of the soil,

after the zinc oxide is removed, may be necessary to meet clean up objectives. The test was conducted using both lime and triple super phosphate (common fertilizer). Before beginning the test a sample (E-1), was collected of the pure zinc oxide. The first test was conducted using only lime as a drying agent. Lime and zinc oxide were mixed using a ratio of 25% lime and 75% zinc oxide. Sample (E-2) was then collected from this mixture for analyses. The second test consisted of mixing super triple phosphate with the zinc oxide and lime mixture at a ratio of 75% lime and zinc oxide to 25% triple super phosphate. A sample of the mixture (E-3) was then collected. All samples were analyzed for TCLP lead, cadmium and zinc. The samples were hand delivered to Prairie Analytical Systems in Springfield for rush analysis. Sample results showed triple super phosphate was very effective in binding the lead, cadmium and zinc. Treatment of the soil with triple super phosphate to bind the remaining metals may be an option. Sample results are provided in Attachment 3.

After all the visual zinc oxide is removed, sampling will be conducted for closure in accordance with the sampling and analysis plan discussed in Phase III - Section G.

B. CONTAINMENT AREAS 2 AND 4

Water in Containment Area #2 will be sampled to determine if it meets the existing NPDES discharge requirements. If the water meets the requirements, it will be pumped to the permitted outfall area for discharge. If the water does not meet the requirements, it will be transported to the plant for use as cooling tower make up water. After the water is removed from Containment Area #2, any visible zinc oxide will be removed and placed into Containment Area #1. Sampling will be conducted in Containment Areas 2 & 4 for closure in accordance with the sampling and analysis plan discussed in Phase III - Section G.

C. LONG LAKE - CONTAINMENT AREA #3

Before removing of the zinc oxide from Long Lake, two rock pads will be placed south of the rock road/dam to allow a trackhoe access across Long Lake. The trackhoe will remove all impacted vegetation and place it on the rock road/dam where another trackhoe will transport it to the shredder. The shredder will be located within the containment area. After the vegetation is removed and the lake is dewatered, the trackhoe will scrape the zinc oxide from Long Lake toward the rock road/dam. The trackhoe will place the zinc oxide into Containment Area #2. After all the visual zinc oxide is removed, sampling will be conducted for closure. If the sample results indicate the remaining soils are below the applicable objectives, the two rock pads will be removed. The rock forming the rock pads will be inspected and any affected rock will be washed at the decontamination pad to allow further use. The soil beneath the pads will be removed and placed into containment area #2. After all the visual zinc oxide is removed, sampling will be conducted for closure in accordance with the

sampling and analysis plan discussed in Phase III - Section G.

D. VEGETATION REMOVAL

A large portion of the spill area contained dense vegetation such as trees, shrubs, and plants. The vegetation was removed and fed into a grinder. The shredded material will be stored within the containment area. We anticipate using the material to help dry the zinc oxide. If this is not possible, the material will be mixed with the soil and disposed.

E. DECONTAMINATION PROCEDURES

All equipment will be decontaminated by high pressure steam cleaning following gross removal by scraping. All decontamination will be conducted on a decontamination pad constructed at the east edge of the rock dam/road. Refer to the Figure 2 for the location of the decontamination pad. All personnel entering the contaminated area must go through decontamination before entering a clean area in accordance with the Site Health & Safety Plan. All decontamination rinse waters and solids will be collected in a sump and transported to the containment area to be handled as the waste present in those areas.

F. DISPOSAL OPTIONS

The zinc oxide recovered from Long Lake and Containment Area #2 will be handled in the same manner as Chemetco's existing zinc oxide filter cake. The zinc oxide will be sold to existing customers for further metal reclamation.

G. CLOSURE

A sampling and analysis plan will be submitted to the IEPA for review. After concurrence from the IEPA of the plan is received sampling and analyses will be conducted and the results submitted to the IEPA. At the completion of the remediation, a closure plan will be submitted to the IEPA, Bureau of Land.

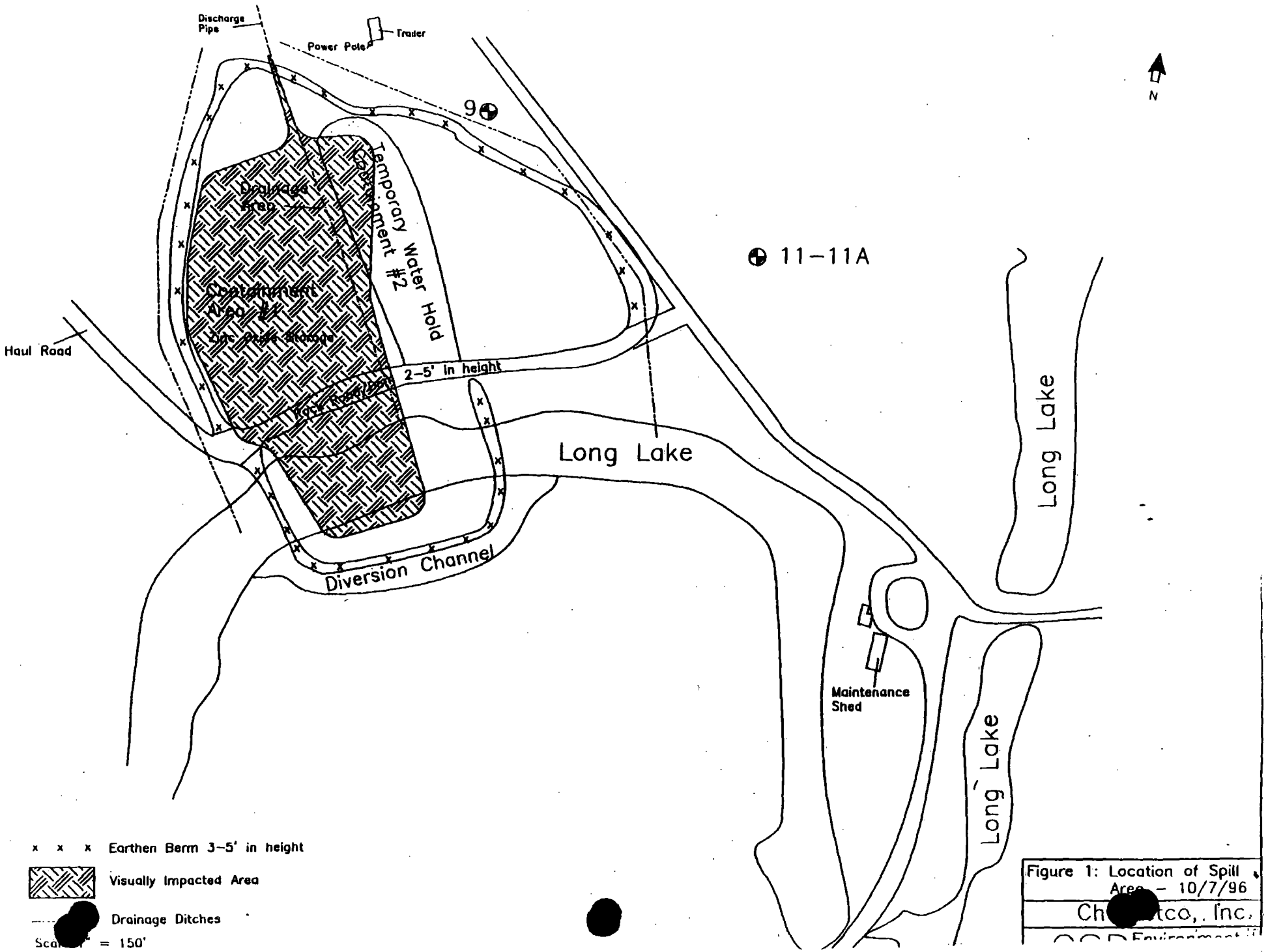


Figure 1: Location of Spill Area - 10/7/96

Ch[redacted]tco, Inc.

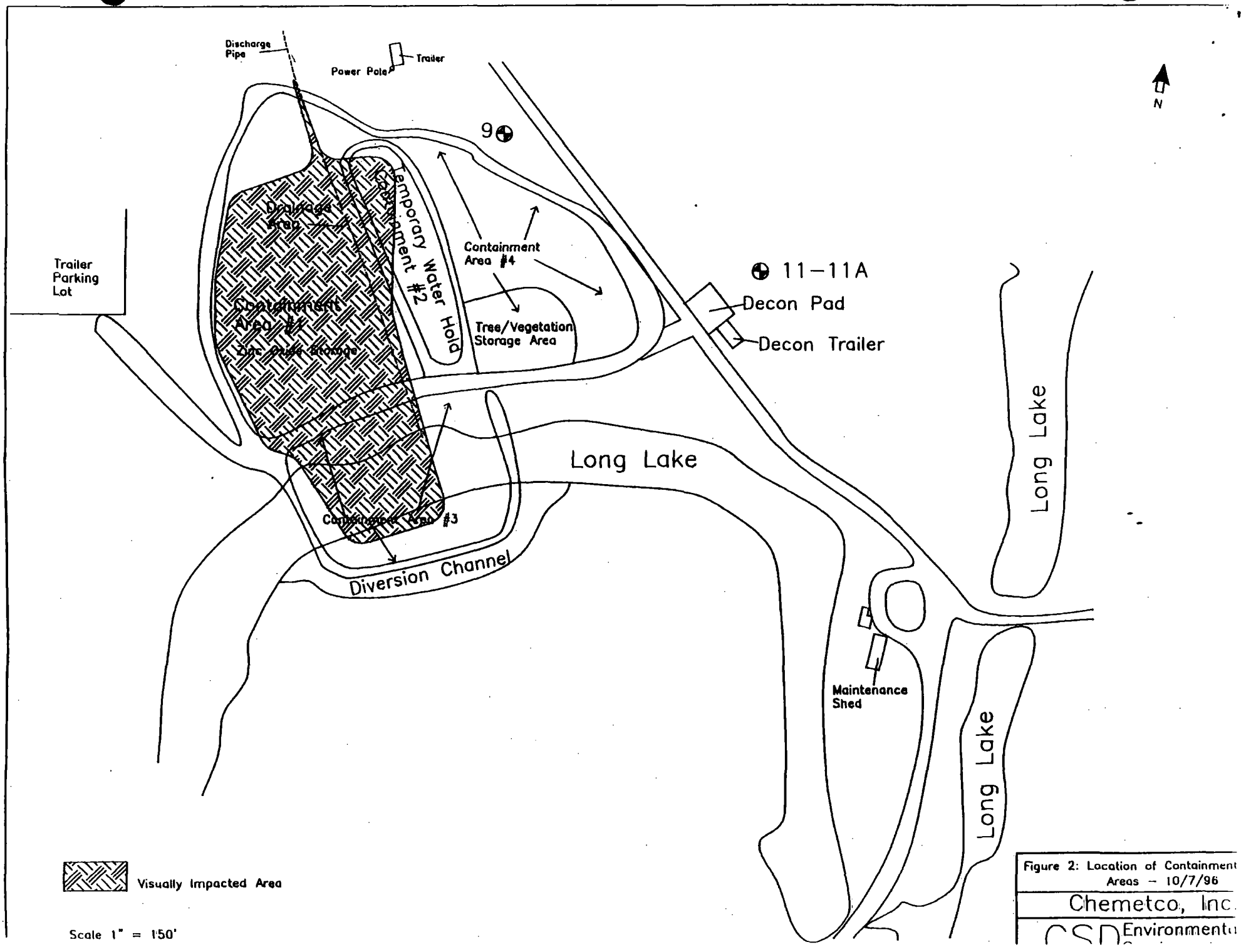


Figure 2: Location of Containment Areas – 10/7/96

Chemetco, Inc.

CSD Environmental

ATTACHMENT 1
SAMPLE RESULTS FROM ENVIRONMENTAL ANALYSIS

TEST RESULTS REPORT
FOR CHEMETCO

LOG NUMBER	SAMPLE DESCRIPTION	RESULTS OF ANALYSIS	UNITS OF MEASURE
1815410	X101 c		
	SAMPLE DATE:09/18/96		
	TCLP Lead	428	mg Pb/l
	TCLP Cadmium	26.8	mg Cd/l
	TCLP Zinc	1740	mg Zn/l
	Total Metals Prep for solids	1	
	Lead	3.10	% w/w
	Cadmium	754	ug/g
	Zinc	6.11	% w/w
	pH Value	8.25	10% Soln
	TC Leaching Proc.	Vol.55,#61	Fed.Reg.
	Total Metals Prep/Microwave	09/25/96	
1815411	X102 c		
	SAMPLE DATE:09/18/96		
	TCLP Lead	76.2	mg Pb/l
	TCLP Cadmium	18.7	mg Cd/l
	TCLP Zinc	2920	mg Zn/l
	Total Metals Prep for solids	1	
	Lead	4.66	% w/w
	Cadmium	799	ug/g
	Zinc	8.28	% w/w
	pH Value	8.63	10% Soln
	TC Leaching Proc.	Vol.55,#61	Fed.Reg.
	Total Metals Prep/Microwave	09/25/96	
1815412	X103 c		
	SAMPLE DATE:09/18/96		
	TCLP Lead	191	mg Pb/l
	TCLP Cadmium	27.4	mg Cd/l
	TCLP Zinc	2800	mg Zn/l
	Total Metals Prep for solids	1	
	Lead	5.71	% w/w
	Cadmium	1254	ug/g
	Zinc	10.7	% w/w
	pH Value	8.85	10% Soln
	TC Leaching Proc.	Vol.55,#61	Fed.Reg.
	Total Metals Prep/Microwave	09/25/96	
1815413	S001 c		
	SAMPLE DATE:09/18/96		
	Cadmium	2.44	mg Cd/l
	Zinc	6.78	mg Zn/l
	Total Metals Prep/GTF AA	09/26/96	
	Lead	4.15	mg Pb/l
	Total Metals Prep/Microwave	09/25/96	

ATTACHMENT 2
MSDS SHEET FOR CODE L LIME

MISSISSIPPI LIME COMPANY - MATERIAL SAFETY DATA SHEET
OSHA HAZARD COMMUNICATION

PRODUCT IDENTIFICATION	CHEMICAL ABSTRACT NUMBER	DATE PREPARED
Code L	MIXTURE	08-May-95

Section I

Manufacturer	24 Hour Emergency Contact Number	HMIS RATING
Mississippi Lime Company P.O. Drawer 61 Highway 61 Ste. Genevieve, MO 63670	(800) 437-5463	Health 3 Flammability 0 Reactivity 2 Protective Equip. E
	Telephone Number for Information (800) 437-5463	
	Signature of Preparer: Mark S. DeVore	

Section II - Hazardous Ingredients / Identity Information

Hazardous Components (Specific Chemical Identity; Common Names)		OSHA PEL	ACGIH TLV	Other Limits Recommended	% (Optional)
Calcium Oxide; Quicklime	CAS 1305-78-8	5 mg/m³	2 mg/m³		to 45 %
Calcium Hydroxide	CAS 1305-62-0	5 mg/m³	5 mg/m³		to 85 %
Crystalline Silica (Quartz)	CAS 1409-99-7	0.1 mg/m³	0.1 mg/m³		(0.1 to 0.5 %)

Code L is not listed on the NTP, IARC, or OSHA lists of carcinogens. Crystalline silica, a component of this product, is listed by IARC and NTP but not by OSHA. IARC classifies crystalline silica as "probably carcinogenic to humans" on the basis that there is limited evidence for carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals. "Limited evidence" means that a causal relationship is possible; however, other explanations such as a chance, bias or confounding factors cannot adequately be excluded. NTP also classifies crystalline silica on the basis of limited evidence as "a substance which may reasonably be anticipated to be a carcinogen" (Rev. 11/93).

Section III - Physical / Chemical Characteristics

Boiling Point (Calcium Oxide)	5162 °F	Specific Gravity (H²O) = 1	3.00
Vapor Pressure (mm Hg)	NA	Melting Point	1076 °F
Vapor Density (Air = 1)	NA	Evaporation Rate	NA
Solubility in Water	-	0.2 % @ 0 °C	
Appearance and Color		Tan powder; odorless	

Section IV - Fire and Explosion Hazard Data

Flash Point	NA	Flammable Limits-	NA
Extinguishing Method	NA		
Special Fire Fighting Procedures	NA		
Unusual Fire and Explosion Hazards	NA		

Section V - Reactivity Data

Stability	Unstable		Conditions to Avoid -	NA
	Stable	X		
Incompatibility (Materials to Avoid)			Acids, Fluorine	
Hazardous Decomposition or Byproducts			None	
Hazardous Polymerization	May Occur		Conditions to Avoid -	NA
	Will Not Occur	X		

MISSISSIPPI LIME COMPANY - MATERIAL SAFETY DATA SHEET
OSHA HAZARD COMMUNICATION

PRODUCT IDENTIFICATION	CHEMICAL ABSTRACT NUMBER	DATE PREPARED
Cocid L	MIXTURE	06-May-98

Section VI - Health Hazard Data

Routes(s) of Entry	Inhalation?	YES	Skin? YES	Ingestion? YES
Health Hazards	Acute	Corrosive to skin and eyes. Causes irritation and inflammation to mucous membranes and respiratory passages.		
	Chronic	Long term exposure may cause irritation, ulceration and perforation of nasal septum.		

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated?
Oxide and Hydroxide	NO	NO	NO
Crystalline Silica	YES	YES	Not on a current list

Signs and Symptoms of Exposure	Irritation of skin, eyes, and respiratory tract.
Medical Conditions Generally Aggravated by Exposure	Respiratory disease, skin sensitivity.
Emergency and First Aid Procedures	Remove to fresh air. Wash skin with soap and water. Flush out eyes with generous amounts of water. Drink plenty of water if conscious. See Physician.

Section VII - Precautions for Safe Handling

Steps To Be Taken in Case Material is Released or Spilled	Normal cleanup procedures. Care should be taken to avoid causing dust to become airborne. Vacuum cleaning systems are recommended.
Waste Disposal Method	Dispose of in accordance with Federal, State and Local regulations.
Precautions to Be Taken in Handling	Store away from incompatible substances
Other Precautions	None

Section VIII - Control Measures

Respiratory Protection
Dust filter mask

Ventilation	Local Exhaust - To Maintain TLVs and PEL's	Special - NA
	Mechanical - To Maintain TLVs and PEL's	Other - NA

Protective Gloves
Leather or Rubber

Eye Protection
Wear dust goggles

Other Protective Clothing
Long sleeve shirts and pants.

Work/Hygienic Practices
Maintain dust concentrations below TLVs and PEL's. If not provide use respiratory protection.

Section IX - Transportation

Not regulated by Department of Transportation unless product is shipped by air.

ATTACHMENT 3
SAMPLE RESULTS FROM PRAIRIE ANALYTICAL SYSTEMS, INC.

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 25 September 1996
Date Received: 26 September 1996
Date Analyzed: 27 September 1996
Date Reported: 27 September 1996

Project: Chemetco

PAS Project Code: CSD-120

Sample Description:	E-1	E-2	E-3
PAS Sample No.:	9609263995	9609263996	9609263997

TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.004	26.5	21.3	2.22	6010A
Lead	0.042	195	80.1	0.20	6010A
Zinc	0.002	1083	801	49.7	6010A

Miscellaneous Analysis

Parameters	Detection Limit	Result	Result	Result	E.P.A. Method
pH (Units)	—	8.63	8.26	4.72	9045B

Stephen R. Johnson, Laboratory Director

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 25 September 1996
Date Received: 26 September 1996
Date Analyzed: 27 September 1996
Date Reported: 27 September 1996

Project: Chemetco

PAS Project Code: CSD-120

Sample Description: W-1

PAS Sample No.: 9609263998

Total Metal Analysis

Analytes	Detection Limit mg/l	Result mg/l	E.P.A. Method
Cadmium, Total	0.004	1.09	6010A
Lead, Total	0.042	0.64	6010A
Zinc, Total	0.002	2.59	6010A

Miscellaneous Analysis

Parameters	Detection Limit	Result	E.P.A. Method
pH (Units)	—	8.29	9040A

Stephen R. Johnson, Laboratory Director

Chain of Custody Record

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD Environmental	Project	Chemtec
Address	2220 Yale Blvd.	Contact Person	Marc Sinnaeve
City, State, Zip	Springfield, IL 62703	P. O. #/ Invoice to:	
Phone Number	522-4085	Facsimile Number	

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling		Container		Preservative	Analysis Requested	PAS Sample Number
		Date	Time	Size	No.			
E-1		9/25	3:00p	4oz	1		pH, TCLP (Pb, Cd, Zn)	3995
E-2		"	3:20p	"	1		"	3996
E-3		"	3:38p	"	1		"	3997
W-1		"	4:22p	500ml	1		" total Pb, Cd, Zn per Harry C. 9/26/96 9:05 am	3998

Relinquished by: Shane A Thorpe		Received by: Sarah A Tuttle	
Date: 9/26/96	Time: 9:00 am	Date: 9/26/96	Time: 9:00 am
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-120

Copies: White - Client, Yellow - Lab Receiving, Pink - Retained by Sampler

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 25 September 1996
Date Received: 26 September 1996
Date Analyzed: 27 September 1996
Date Reported: 27 September 1996

Project: Chemetco

PAS Project Code: CSD-120

Sample Description: W-1

PAS Sample No.: 9609263998

Total Metal Analysis

Analytes	Detection Limit mg/l	Result mg/l	E.P.A. Method
Cadmium, Total	0.004	1.09	6010A
Lead, Total	0.042	0.64	6010A
Zinc, Total	0.002	2.59	6010A

Miscellaneous Analysis

Parameters	Detection Limit	Result	E.P.A. Method
pH (Units)	—	8.29	9040A

Stephen R. Johnson, Laboratory Director

ATTACHMENT 2

Corp of Engineers Permit

CHEMETCO, INC.
WORK PLAN FOR THE IMMEDIATE RESPONSE TO ZINC OXIDE SPILL
SEPTEMBER 25, 1996

Prepared by: CSD ENVIRONMENTAL SERVICES, INC.
2220 Yale Boulevard
Springfield, IL 62703
217/522-4085
217/522-4087 (fax)

INTRODUCTION

A spill of apparent zinc oxide material was reported to the National Response Center and Illinois Emergency Management Agency on September 19, 1996. The spill was found during a routine RCRA Inspection conducted by the IEPA on September 18, 1996. Personnel from USEPA were also present during the inspection. During the inspection, material that appears to look like zinc oxide was found to be discharging from a pipe located south of Old Oldenburg Road. The IEPA and Chemetco collected samples of the water and of the impacted sediment. Three soil samples were collected and one water sample. Chemetco's samples were shipped to Environmental Analysis in the afternoon of the 18 th. Analysis was requested for total metals - lead, cadmium, and zinc. TCLP metals - lead, cadmium and zinc. A rush turnaround was requested by Chemetco of the samples.

This work plan addresses the temporary containment and removal of the zinc oxide material. CSD has confirmed the release is confined to Chemetco's property. The plan will be implement in three phases. The first phase will focus on containment of the spilled material, the second phase will focus on dewatering of the area and final phase will be removal of the zinc oxide. A separate plan will be submitted for determining sampling locations, parameters, etc.. for requesting closure of the incident.

CONTAINMENT

In order to contain the spill material to a small area near Long Lake, it was necessary to construct a diversion channel to reroute the lake past the spill area. A 404 C permit was required by the Army Corp of Engineers to reroute the lake. A Permit Application was faxed to the Corp on Friday September 20, 1996 with a request to begin construction on Saturday, September 21. The application consisted of a drawing (Figure 1) showing the impacted area and the location of all proposed dams and the diversion channel. The following steps were and/or are currently being conducted to achieve containment:

1. A road is currently being constructed with 3" minus rock at a two foot height beginning from the west side of the private lane. Grade will increase to 5 feet in height at location of drainage ditch. Height of 5' will be maintained for approximately 300' where it intercepts the west dam. The purpose of this road will be to allow heavy equipment and trucks to enter into the spill area to begin dewatering and eventually removal of the zinc oxide material. This road

COVER SHEET

FAX

Greg, Pat
FYI
Tom

To: Chris Cahnovsky
Fax #: 618/346-5155
Subject: Work Plan for Zinc Oxide Spill at Chemetco
Date: September 25, 1996
Pages: 5, including this cover sheet.

COMMENTS:

Work Plan for Chemetco as you requested. I will be at the plant tommorrow if need more details. You can reach me at 217/494-4085 or pager # 217/535-8985.

From the desk of...

Cindy Davis
President
CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

217/522-4085
Fax: 217/522-4087

is referred to as the rock road/dam;

2. The north side of the road will be lined with 8 to 10 mil thickness plastic to inhibit water to flow under the rock road/dam and eventually reach Long Lake. Coarse aggregate #6 will be placed on top of the liner to hold it in place;

3. A earthen berm was constructed to a height of approximately 5' on the west side of the spill area. A drainage ditch will be constructed to divert surface water to Long Lake around the impacted area. Rock may be used to extend the earthen berm to the rear of the truck parking lot to allow additional access for heavy equipment to the area;

4. A diversion channel 25 feet wide by 3 to 5 feet in depth was constructed to reroute water in Long Lake around the spill area;

5. Two dams on Long Lake were constructed to assist in the diversion. The east dam is approximately 10 to 12 feet wide. The west dam is approximately 15' wide. The dams will also allow tanker truck access for dewatering; and

6. A earthen berm was constructed to a height of approximately 3' on the east side of the spill area. A drainage ditch will be constructed to divert surface water to Long Lake around the impacted area.

DEWATERING

The diverted portion of Long Lake will be dewatered by excavating two holes approximately 3' x 3' to install two slotted 55 gallon drums. A portable trash pump will be used to begin dewatering. The purpose of the drums is to minimize the amount of solids reaching the trash pumps. Water will be pumped from the lake into a tank and transported to the plant for use in the polish pits.

The portion of the spill area north of the rock road/dam will be dewatered by again excavating a 3' x 3' hole and inserting the drum with the trash pump. Water will be handled the same as above.

PILOT TEST

A field pilot test will be conducted to determine the most feasible drying agent and the appropriate mixture ratios for the zinc oxide. The tests will be conducted using lime and triple super phosphate (common fertilizer) with varying mixture ratios. One test will be conducted using only lime as a drying agent. The lime and zinc oxide will be mixed until the desired consistency is found. Our goal is not to dry the zinc oxide to a solid, but to leave it in a workable semi solid state that will allow loading into semi trailers for disposal. A sample will be collected from the lime/zinc oxide mixture. The second test will consist of mixing super triple phosphate and zinc oxide until the desired consistency is found. A sample of the mixture will be collected. The third test will consist of mixing lime, super triple and zinc oxide. Mixture ratios of 50% triple and 50% zinc oxide/lime and 75% triple and 25% zinc oxide lime will be used. Analysis of all samples will be requested for TCLP lead,

cadmium, zinc and copper. The samples will be shipped to Prairie Analytical in Springfield for rush turnaround time of 24 hours. Chemists are assisting CSD and Chemetco is evaluating other mixture agents to use. Additional tests may be conducted based upon their recommendations. CSD and Chemetco will keep the IEPA informed of any chemists recommendations.

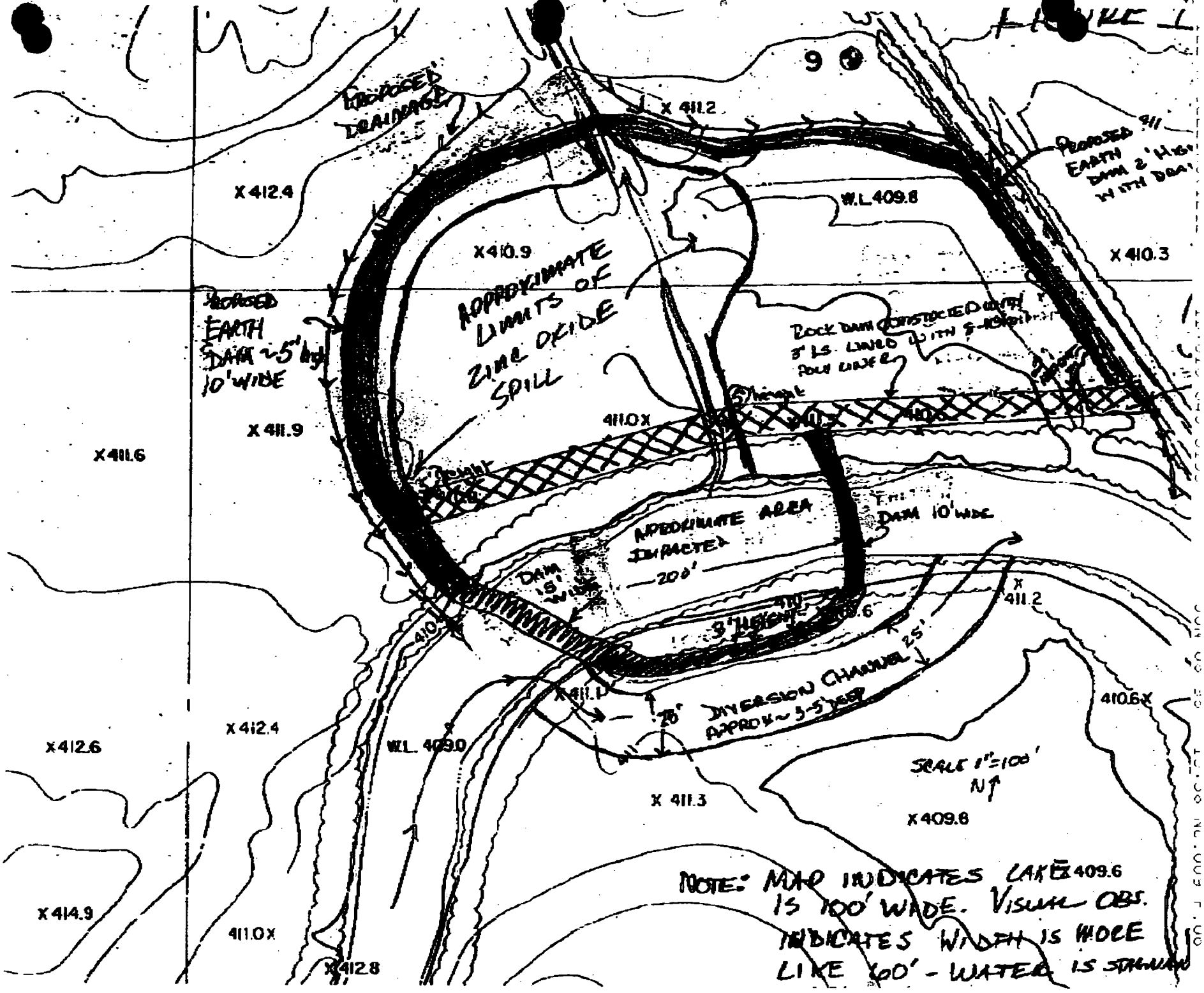
ZINC OXIDE REMOVAL

The zinc oxide in Long lake will be excavated after the lake is dewatered and the trees, stumps and other debris is removed. The excavated zinc will be placed on the other side of the rock road/dam for further handling. Zinc oxide material will be pushed from the north to the south against the rock road/dam to try to force the water to separate from the zinc oxide material. Water will be collected at the ends of the east and west side adjacent to the rock road.

The trees removed from the portion of Long Lake will be shredded. The shredded material will be mixed with the zinc oxide to use as a drying agent.

DISPOSAL OPTIONS

If the material, after the drying agent is added passes the test for TCLP lead and cadmium. The material may be shipped as a non hazardous waste to a special waste landfill such as Waste Management's Chain of Rocks Landfill or the material can be sold to Chemetco's current zinc oxide customers. If the material continues to fail TCLP, disposal options will be further evaluated.



** TOTAL PAGE.05 **

State of Illinois
ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director
618/346-5120

2009 Mall Street, Collinsville, IL 62234

September 30, 1996

Chemetco, Inc.
Attn: Mr. Greg Cotter, Environmental Manager
Hgwy. Rt. 3, Box 67
Hartford, Illinois 62048

RE: 1198010003 -- Madison County
Chemetco, Inc.
ILD048843809
FOS

Dear Mr. Cotter:

This letter contains the Agency's comments to a document titled Work Plan For The Immediate Response To Zinc Oxide Spill, dated September 25, 1996 and a September 27, 1996 phone conversation between Chris Cahnovsky and Cindy Davis, CSD Environmental. The previously mentioned document was submitted on behalf of Chemetco by CSD Environmental and was received by the Agency on September 25, 1996. The Agency provides the following comments and recommendations.

1) Chemetco must submit as-built scaled drawings of the impoundment area to the Agency.

2) Chemetco must submit a new work plan containing a detailed description of the decontamination protocol at this site. The plan must include methods of disposal for decontamination waste.

3) Inspections of the surface impoundment pursuant to 35 Il. Adm. Code 724.115 and 724.326 must be conducted on a daily basis. Chemetco must have contingencies in place to respond to detections of leaks in the impoundment.

4) To avoid making another regulated unit during clean-up, it is recommended that you obtain any necessary permits for waste disposal prior to initiating excavation activities. If it is necessary to store excavated soil and zinc oxide slurry waste on-site prior to disposal, do so only in containers or tanks for less than ninety (90) days. Do not create regulated waste piles by storing the excavated hazardous waste in piles. The ninety (90) day accumulation time exemption (35 IAC 722.134) only applies to containers and tanks.

5) Prevent further releases by capping the end of the 10 inch discharge pipe. Also locate the source of the discharge and insure that there are no further releases.

6) The June 30, 1988 Consent Order filed in the Circuit Court for the Third Judicial Circuit Madison County, Illinois states that zinc oxide that is placed on the land is not exempt from the requirements of RCRA or State special waste requirements. Since the zinc oxide slurry discharge to the impoundment is characteristically hazardous for lead and cadmium, it must be managed as a hazardous waste. The waste removed from the impoundment area must be sent to a facility with a USEPA Identification Number and must be permitted to accept the waste.

7) A detailed description of the dewatering process of the zinc oxide slurry in Chemetco's on-site filter presses must be submitted to the Agency before any dewatering takes place. This plan must include but not be limited to the following.

   a) Identify the cells which will be dedicated to the management of hazardous waste;

   b) Describe the flow of waste through the dewatering process;

   c) Provide a detailed description of how Chemetco will prevent the mixing of the current generation of zinc oxide with the zinc oxide removed from the impoundment. Chemetco must not mix the hazardous waste zinc oxide removed from the impoundment with the zinc oxide generated elsewhere in the plant.

   d) All accumulation of the zinc oxide slurry must be done in containers or tanks in compliance with 35 IAC 722.134 and 728.

8) The Illinois Environmental Protection Agency must be contacted at 618/346-5120 two (2) days prior to sending any waste to the on-site filter presses or associated tanks for dewatering.

9) The Agency must inspect each cell prior to receiving any hazardous zinc oxide waste.

The above submittal must be sent to the Illinois Environmental Protection Agency, 2009 Mall Street, Collinsville, Illinois 62234. If you should have any questions concerning this letter or any other matter, please contact Chris Cahnovsky or myself at 618/346-5120.

Sincerely,

ENVIRONMENTAL PROTECTION AGENCY

Kenneth G. Mensing

Kenneth G. Mensing
Regional Manager
Bureau of Land

KGM:CNC:cas

bcc: BOL - Records Unit
bcc: BOL - Collinsville

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

REPLY TO
ATTENTION OF

September 21, 1996

Regulatory Branch
File No. 199610990

Chemetco
Post Office Box 67
Hartford, Illinois 62048

Gentlemen:

We have reviewed your facsimile of September 20, 1996, requesting emergency authorization to conduct remedial actions for a recent Zinc Oxide spill affecting Long Lake. The clean-up efforts would involve constructing an earthen levee, averaging 2 to 5 feet high and 10 feet wide, around the perimeter of the affected area. A five-foot-high levee with a poly liner and rock cap would be constructed within the perimeter of the earthen levee, directly adjacent to the affected portion of Long Lake, to serve as a containment area. The dammed portion of Long Lake would be dewatered and excavated to remove the presence of Zinc Oxide. This material would be pumped over the adjacent lined and rock capped levee for further remedial action. An unnamed tributary to Long Lake, flowing into the affected area, would have to be diverted around the earthen levee for an approximate 700-foot-long reach to maintain flows. In addition, an approximate 450-foot-long by 25-foot-wide by 4-foot-deep channel would be excavated to keep Long Lake connected below the dammed off portion. The subject activity site is located approximately 4 miles directly south of Hartford, near Oldenburg, in Madison County, Illinois.

We have determined that the proposed project is authorized under Section 404 of the Clean Water Act by existing Department of the Army nationwide permits as described in 33 CFR 330, Appendix A (B)(38). Enclosed is a copy of the nationwide permit, and terms and conditions (marked in red) with which you must comply.

The Illinois Environmental Protection Agency has denied water quality certification for these permits. You must obtain individual water quality certification or generic 401 certification or provide to the Corps a copy of the application to the state for the certification. If the IEPA fails to act within a reasonable period of time (60 days from the date of this letter), a waiver will be presumed. Upon receipt of water quality certification, the proposed work is authorized. If the water quality certification is conditioned by the state, these conditions will become part of the Corps permits. The District Engineer has conditioned this permit to include the following:

a. Any excess material associated with the activities of this project will not be discharged into either aquatic areas or wetland areas.

b. All excess material will be removed to upland sites and not stored or abandoned within the floodplain area.

c. The applicant shall ensure that the project not cause: (1) violation of applicable water quality standards of the Illinois Pollution Control Board, Title 35, Subtitle C: Water Pollution Rules and Regulations; (2) water pollution as defined and prohibited by the Illinois Environmental Protection Act; and (3) interference with water use practices near public recreation areas or water supply intakes.

d. All areas affected by construction shall be mulched and seeded as soon after construction as possible. The applicant shall undertake necessary measures and procedures to reduce erosion during construction. Interim measures to prevent erosion during construction shall be taken and may include the installation of staked straw bales, sedimentation basins and temporary mulching.

e. All impacted areas including, but not limited to, Long Lake, the unnamed tributary, and wetland sites will be returned to their pre-spill and pre-project conditions upon completion of the remedial actions. A restoration plan must be submitted to this office within six months from the date of this letter and all restoration activities must be completed within one year from the date of this letter.

This determination is applicable only to the permit program administered by the Corps of Engineers. It does not eliminate the need to obtain other Federal, state, or local approvals before beginning work.

You are reminded that the permit is based on submitted plans. Variations from these plans shall constitute a violation of Federal law and may result in the revocation of the permit. This verification will be valid until the nationwide permit is modified, reissued, or revoked prior to January 21, 1997. It is incumbent upon you to remain informed of changes to the nationwide permits. We will issue a public notice announcing the changes when they occur. Furthermore, if you commence, or are under contract to commence, this activity before the date the nationwide permit is modified or revoked you will complete the activity under the present terms and conditions of the nationwide permit.

If the proposed project does not satisfy all conditions as indicated, please contact Charles Frerker at (314) 331-8583 for advice or information you may need in preparing an application for an individual permit.

Sincerely,

Michael Ricketts
Corps/Rivers Project Manager

Enclosure

Copy Furnished: (w/o enclosure)

Mr. Bruce Yurdin
Illinois Environmental Protection Agency
DWPC, Permit Section, Watershed Unit
2200 Churchill Road
Springfield, Illinois 62794-9276

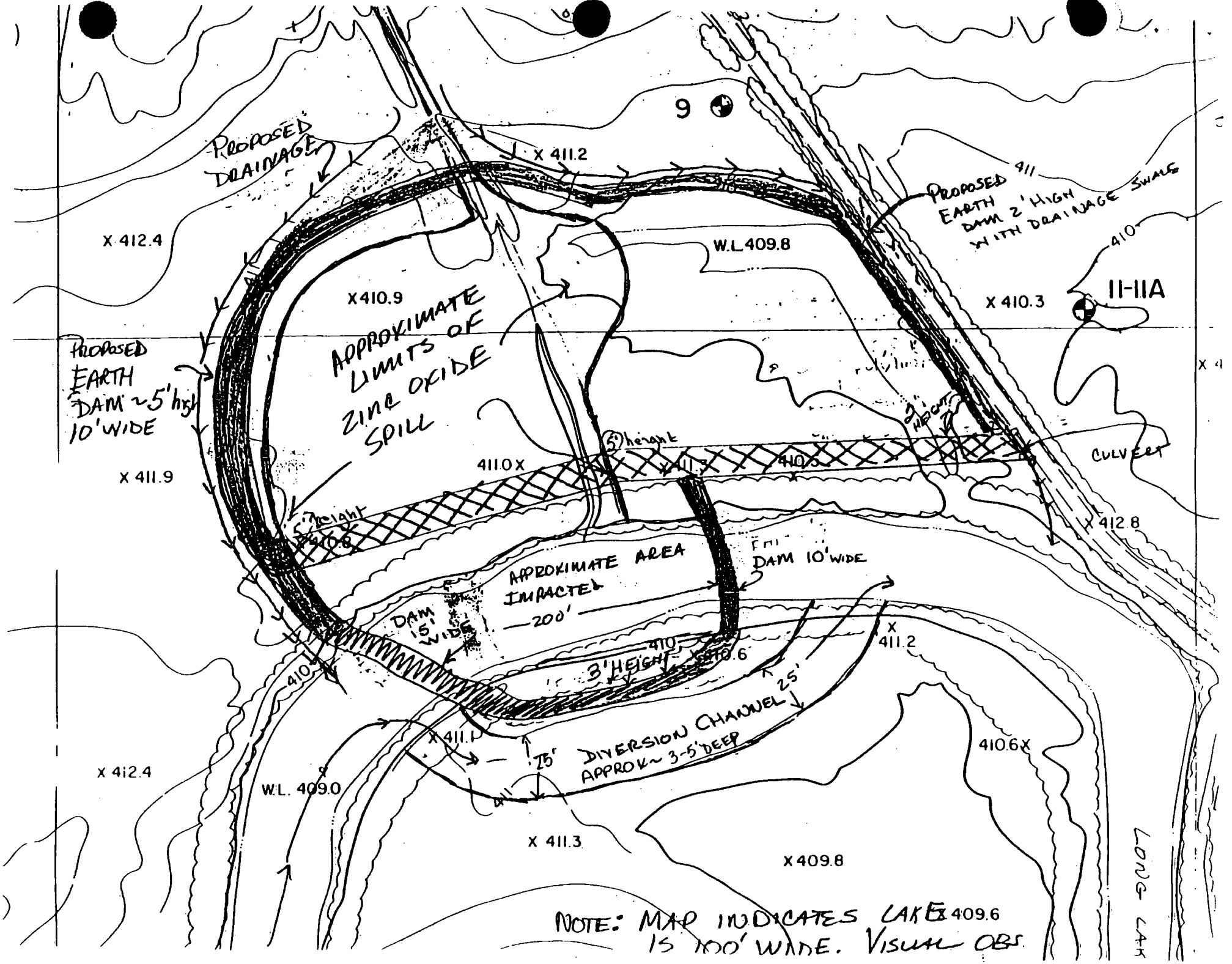
Mr. Robert Dalton
Illinois Department of Natural Resources
Office of Water Resources
3215 Executive Park Drive
Post Office Box 19484
Springfield, Illinois 62794-9484

Ms. Joyce Collins
U.S. Department of the Interior
Fish and Wildlife Service (ES)
Rural Route 3 , Box 328
Marion, Illinois 62959-9579

Mr. Gerald D. Winn
U.S. Environmental Protection Agency
Region V
Wetland Protection Section (5WQW-16J)
77 West Jackson Boulevard
Chicago, Illinois 60604

Ms. Anne Haaker
State Historic Preservation Office
Illinois Historic Preservation Agency
State Capitol
Springfield, Illinois 62701

Mr. Robert Schanzle
Illinois Department of Natural Resources
524 South Second Street
Springfield, Illinois 62701-1787


9
PROPOSED DRAINAGE
X 411.2
X 412.4
W.L 409.8
PROPOSED EARTH DAM 2' HIGH WITH DRAINAGE SWALES
410
X410.9
APPROXIMATE LIMITS OF ZINC OXIDE SPILL
X 410.3
11-11A
PROPOSED EARTH DAM ~5' high 10' WIDE
X 411.9
411.0 X
5' height
410.5
2' HEIGHT
CULVERT
X 412.8
APPROXIMATE AREA IMPACTED
200'
DAM 10' WIDE
DAM 15' WIDE
410
3' HEIGHT
X410.6
X 411.2
410
411.1
75' DIVERSION CHANNEL APPROX ~ 3-5' DEEP
25'
410.6 X
X 412.4
W.L. 409.0
X 411.3
X 409.8
LONG CAY
NOTE: MAP INDICATES LAKE 409.6 IS 100' WIDE. VISUAL OBS.

DSC

Chemetco — Construction Plans

1. Construct road with 3" minus at a 2 foot height - Beginning from west side of private lane. Grade increases to 5' height at location of drainage ditch. Height of 5' is maintained for approx 300' where intercepts earthen dam.

2. Line N side of road with 2-10 mil poly liner as a barrier to hold water. CA-6 to cover poly liner

3. Create an earthen dam 5' high on west side of spilled area. Create drainage swale to divert surface (rain) water to Long Lake around the impacted area.

4. Construct a diversion channel 25' feet wide x 3-5 feet deep.

5. Construct 2 dams on Long Lake. East dam ~~section~~ 10-12' wide. West dam 15' wide

6. Construction order

   1) Build Rock dam/road

   2) Excavate Div. channel & build dam ~3' high on N side of channel.

   3) Construct 15' wide dam on west side

   4) Construct 12' wide dam on East side

   5) Finish last portion of Div. channel

. 6<E

TO RELEASE WATER.

7. TO REMOVE SPILLED MATERIAL FROM LAKE ONCE DAMMED:

A. TEMPORARY EARTH PLATFORM WILL BE CONSTRUCTION TO ALLOW TRACKOE ACCESS TO EXCAVATE. EXCAVATED MATERIAL TO BE DEPOSITED ON NORTH SIDE OF ROCK DAM/ROAD.

B. SOIL + WATER SAMPLES WILL BE COLLECTED TO DETERMINE when CLEANUP IS finished. Clean up #'s to be determined by IEPA.

TREES - DEAD Present in ~~OF~~ AFFECTED PORTION OF LAKE WILL BE REMOVED.

ATTACHMENT 3

Initial Excavation Sample Results

Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory

CSD Environmental Services, Inc.
2220 Yale Boulevard
Springfield, IL 62703

Date Sampled: 09 October 1996
Date Received: 10 October 1996
Date Analyzed: 11 October 1996
Date Reported: 11 October 1996

Project: Chemetco

PAS Project Code: CSD-122

Sample Description:	Long Lake 1	Long Lake 2	Long Lake 3
Sample Number:	9610104222	9610104223	9610104224

Total Metals Analysis

Parameters	Detection Limit mg/kg	Result mg/kg	Result mg/kg	Result mg/kg	E.P.A. Method
Cadmium	0.004	56.3	8.3	16.1	6010A
Lead	0.001	27.1	75.5	333	7421
Zinc	0.002	519	498	716	6010A

TCLP Metals Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.004	<0.004	<0.004	1.3	6010A
Lead	0.042	<0.042	<0.042	10.4	6010A
Zinc	0.002	4.5	4.9	77.1	6010A

Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

Chain of Custody Record

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD ENVIRONMENTAL INC	Project	CHEMETCO
Address	2220 YALE	Contact Person	M. SIMMERING / CINDY DAVIS
City, State, Zip	SPFLD IL 62703	P. O. #/ Invoice to:	CSD ENV. INC.
Phone Number	522-4085	Facsimile Number	522-4087

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling		Container		Preservative	Analysis Requested	PAS Sample Number
		Date	Time	Size	No.			
LONG LAKE 1	Soil	10/9	A.M.	4oz	1	—	TOTAL + TCLP LEAD, CADMIUM, ZINC	4222
LONG LAKE 2	"	"	"	"	"	"	" " " " "	4223
LONG LAKE 3	"	"	"	"	"	"		4224
							NOTE: NEED QUICK TURN AROUND AND FAX RESULTS TO (618) 254-0138 ATT/ MARC S. + GREG COTTER THANK YOU	

Relinquished by: Marc Simming		Received by: Sarah A Fulton	
Date: 10/9/96	Time: 3:05 P.M.	Date: 10/10/96	Time: 10:00 am
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS: Friday

PAS Project CODE: CSD-122

Form PASCOC1

Copies White - Client, Yellow - Lab Receiving, Pink - Retained by Sampler

ATTACHMENT 4

Sampling and Analysis Plan - Zinc Oxide Spill

9441.1986(07)

JAN 23 1986

MEMORANDUM

SUBJECT: Regulatory Interpretation With Respect to Leaks, Spills, and Illegal Discharges of Listed Wastes to Surface Waters

FROM: Marcia E. Williams, Director
Office of Solid Waste

TO: David Stringham, Chief
Solid Waste Branch, 5HS-13
Region V

This is in response to your memoranda, dated August 8 and December 24, 1985, in which you request clarification of the mixture rule as it applies to leaks, spills, and illegal discharges of listed wastes to surface waters, resulting in contamination of the sediment. First, let me apologize for taking so long in getting back to you. I hope this delay has not caused you any problems.

In your memoranda, you indicate that the Corps of Engineers in carrying out their responsibilities to maintain the navigability of Astabula Harbor found that the bottom sediments of the harbor were severly contaminated; subsequent investigation suggested that the source of the contaminants is primarily form Fields Brook, a tributary to the harbor. Upon further investigation, it appears that some of the contamination may have occured as a result of spills or leaks from treatment, storage, and disposal units. Therefore, you surmise by application of the mixture rule, that the contaminated sediments would be hazardous under RCRA and subject to the appropriate management standards. You believe such a reading of the rules was never intended, but rather the contaminated sediments should only be considered hazardous if they exhibit one or more the characteristics of hazardous waste. Unless such an interpretation is taken, you believe that all sediments contained in the industrialized harbors on the Great Lakes (a total of 109) should be managed as listed wastes.

Charter RCRA/Cwa

pt source = RCRA exclusion, CWA violation

C2

FAX TRANSMISSION

U.S. ENVIRONMENTAL PROTECTION AGENCY

Office of Enforcement & Compliance Assurance
Office of Regulatory Enforcement - Water Division - Municipal Branch
401 M Street, S.W. (Mail Code 2243A)
Washington, D.C. 20460
Fax # - (202) 564-0024

Date 1-24-00

To: Jon Martin **Phone #**

Company: EPA Region V

Fax #: 312-886-0747 **Pages: including this cover sheet** 4

From: Cassandra Lee **Telephone:** 202-564-4057

Subject: CWA/RCRA Authority

COMMENTS: Jon - I'll fax Mary Andrews the info

FAX TRANSMISSION

The regulation of contaminated materials depends in large part upon the regulations being applied and upon the source of the contamination. As written, the mixture rule would not cause the sediments in the harbors on the Great Lakes (nor in any other harbors or rivers) to be considered hazardous. More specifically, the mixture rule states that any mixture of a hazardous waste with a solid waste causes the entire mixture to be hazardous. Therefore, in order for the mixture rule to be triggered, wastes must be mixed or somehow combined together. In the example cited in your letter, however, wastes are not being mixed (i.e., we would not normally consider sediments in rivers as wastes). Rather, a waste is being disposed of with a non-waste material. Therefore, the mixture rule is not causing these sediments to be hazardous. However, application of the mixture rule is not dispositive of the issue of whether the mixture of a hazardous waste and another substance is regulated. A part from the mixture rule, the mixture of a hazardous waste and a non-waste material is still subject to Subtitle C control. For example, ground water contaminated with a hazardous waste is currently subject to the appropriate requirements in 40 CFR Parts 264 and 265. In addition, if listed hazardous wastes are being discharged into surface waters, this could constitute disposal requiring regulatory control under Subtitle C of RCRA. The major question to answer is whether the discharge resulted from illegal discharges or from point source discharges subject to regulation under the Clean Water Act.

As you are aware, 40 CFR 261.4(a)(2) specifically exempts industrial wastewater discharges that are point source discharges subject to regulation under Section 402 of the Clean Water Act (CWA), as amended. (This authority covers the addition of any pollutant to water of the United States from any discernible, confined, and discrete conveyance, except discharges of dredged and fill material regulated under Section 404.) The point of the wastewater exclusion is to avoid potentially duplicative regulation of point source discharges under RCRA and CWA. Thus, once wastewater flows from an NPDES discharge point into waters of the United States, that wastewater is exempt from RCRA regulation.1/

1/ This is true even if the discharge could be regulated under 402, but is not. A point source discharge without an NPDES permit would be a violation of the CWA, and should be subject to an enforcement action under the Act.

Therefore, it is important to know the source of the contamination. If, for example, there is evidence to demonstrate that hazardous wastes have been dumped into the surface water in a manner that does not trigger Section 402 of the CWA, this constitutes disposal under RCRA and would be subject to the appropriate regulatory controls (If these hazardous wastes were illegally disposed of, enforcement action should also be undertaken.) If this occurs, that sediment which is contaminated by these discharges would be subject to regulation. On the other hand, if the source of the pollutants is from a point source discharge, then you should assume that hazardous wastes have not been discharged into surface waters. Under this situation, these sediments would be regulated under Subtitle C of RCRA only when they are dredged from the surface waters and only if they exhibit one or more of the hazardous wastes characteristics. Thus, I cannot agree with your suggestion that contaminated sediment should not be categorized as listed wastes, no matter the source of contamination. Such an interpretation could invite abuse by persons who illegally dispose of hazardous wastes.

Please feel free to contact Matthew A. Straus at 8-475-8551 if you have any questions.

CHEMETCO, INC.
WASTE ANALYSIS PLAN - TREATMENT OF SLAG FINES
October 23, 1997

Slag fines exhibiting the hazardous characteristic of D008 - lead will be treated to non hazardous levels using a variety of chemical fixation products. A pilot test will be conducted on October 30 and 31 at the facility to determine the effectiveness of several chemical fixation products.

A sample of the slag fines will be collected from each roll off prior to treatment. The sample will be collected using the following procedures:

- The sampler shall wear a new pair of latex gloves;
- A one quart sample of slag fines shall be collected and placed into a plastic ziploc container;
- The ziploc container will be sealed and labeled "slag fines #1 - untreated";
- A chain of custody will be completed by the sampler; and
- The samples will be transported to the laboratory within 24 hours of collection.

The untreated slag fines will be analyzed using the TCLP method for the following metals, antimony, arsenic, barium, beryllium, cadmium, chromium (tot), cyanide (amendable), flouride, lead, mercury(retort residues), mercury (all others), nickel, sulfide, selenium, silver, thallium, vanadium, and zinc. Based upon generator knowledge of the waste stream, no other hazardous waste characteristics are expected to be of concern in the waste.

After treatment in the roll off containers is completed, three samples per roll off container will be collected and composited into one sample for analysis. The samples will be collected using the following procedures:

- The sampler shall wear a new pair of latex gloves;
- A one quart sample of slag fines shall be collected and placed into a plastic ziploc container;
- The ziploc container will be sealed and labeled "slag fines # - treated";
- A chain of custody will be completed by the sampler; and

- The samples will be transported to the laboratory within 24 hours of collection.

Treated samples will be collected for the parameters listed above.

A field notebook will be maintained by the chemist with noting the quantity of slag fines added to the roll off boxes; the amount and type of chemical reagents; mixing times; reagent times; color of slag; and any other pertinent data. A final report of the project will be prepared by the chemist.

Pursuant to 40 CFR, Part 268, D008 has a performance levels of 5.0 mg/l using the TCLP method. The analytical data will be reviewed to determine the effectiveness of the on site treatment. The analytical results will be reviewed to determine if additional treatment is required to treat the lead to less than 5.0 mg/l. In addition, to estimate compliance of underlying metal constituents which become applicable to TC metal waste code D008 in Part 2 of the Phase IV LDR rule, the test results will be compared to the attached Table 4.3 Universal Treatment Standards for Metal/Inorganic Constituents.

CSD ENVIRONMENTAL SERVICES
SITE HEALTH & SAFETY PLAN

The health and safety protocols established in this plan are based on the site conditions and chemical hazards known and/or anticipated to present from available site data. The possibility of undocumented disposal within the site requires a conservative approach to on-si fety procedures. The following Site Safety Plan is intended solely for use during the proposed activities herein described in the si investigation work plan Specification herein are subject to review and revision based on actual conditions encountered in the field during si characterization activities.

Before site operations begin all employees involved in these operations will have read and understood this site safety plan and all revisic made. All operations and equipment will comply with OSHA regulations 29 CFR 1910.120 "Hazardous Waste Operations and Emergen Response" and applicable parts of OSHA 29 1910 and 1926.

A. GENERAL INFORMATION (1910.120(c)(4))

Project Name:	Chemetco, Inc.		
Location:	Route 3 & Oldenburg Road - Hartford, IL		
Client:	Chemetco, Inc.		
Plan Prepared By:	Shane A. Thorpe	Date:	10/22/97
Plan Approved By:		Date:	
Project Start Date:	10/30/97		

B. SITE DESCRIPTION (1910.120(c)(4))

Note: On UST Projects this section should include number, size of vessels and amount of remaining material.

Facility History: Site is a secondary copper smelter located in Hartford, IL (Madison County). The facility currently does not generate any RCRA Hazardous Waste. The facility has five former RCRA storage units which are undergoing closure pursuant to 35 IL Adm. Code, Part 725.

General Site Description: The facility is located in an agricultural, light residential area south of Hartford, IL, about one mile east of the confluence of the Missouri and Mississippi Rivers. The facility was constructed in 1969 and began producing anode and cathode copper, crude lead-tin solder, zinc oxide, and slag in 1970.

C. PROJECT OBJECTIVE(S) (1910.120(b)(3))

Description of Work Activities Planned: Pilot test for on-site treatment of slag fines. Three 25 cubic yard boxes of slag fines will be treated using sodium silicate, lime & cement kiln ~~dust~~ ASH.

D. PROJECT ORGANIZATION (1910.120(b)(2))

Note: Subcontractors employees must also be listed in this section.

Team Member	Responsibility	Type of Safety Training & Date Received
Cindy Davis	Project Geologist/Manager Project Safety Officer	Health & Safety Training For Hazardous Waste Site Investigation, Supervisory Training, OSHA 29 CFR Part 1910.120
Marc Simmering	Field Supervisor / Technician	Health & Safety Training For Hazardous Waste Site Investigation, Supervisory Training, OSHA 29 CFR Part 1910.120
Brock Reinhart	Field Supervisor / Technician	Health & Safety Training For Hazardous Waste Site Investigation, OSHA 29 CFR Part 1910.120

E. CHEMICAL HAZARD ANALYSIS (1910.120(b)(4))

Contaminant	Exposure Limits (TWA)	IDLH	LEL/UEL	Flash Point	Health Hazards Routes of Exposure
Lead	NIOSH - .100 mg/m^3 OSHA - .050 mg/m^3	100 mg/m^3	NA	NA	Inhalation, Ingestion, Skin and/or Eye Contact
Cadmium	NIOSH - * OSHA - .005 mg/m^3	9 mg/m^3	NA	NA	Inhalation

* - Substance has been identified by NIOSH as a potential carcinogen. Respiratory protection is recommended.
NOTE: Material Safety Data Sheets or CHRIS Data Sheets must be attached for all substances identified above.

F. OTHER HAZARDS

Heat Stress: No — If Yes, Specify Precautions:

During Summer months - Take frequent breaks, drink plenty of water, monitor body temp.

Cold Stress: No — If Yes, Specify Precautions:

During winter months - Take frequent breaks to warm up, monitor body temp.

Excessive Noise: No — If Yes, Specify Precautions:

If excessive noise is encountered, hearing protection will be provided.

Confined Space Entry: No — If Yes, Attach Confined Space Entry Permit.

Open Excavations: No — If Yes, Is Entry Required?, If yes, Specify Precautions:

Welding/Cutting: No — If Yes, Specify Precautions:

Heavy Equipment Operation: Yes — If Yes, Type of Equipment and Precautions:

trackhoe - personnel should stay as far away from trackhoe bucket as possible - hard hats should be worn at all times.

Slip, Trip, Fall Hazards: Yes — If Yes, Specify type, location and precautions to be taken:

slip hazard in area - proper boots required

Overhead Utilities Present: No — If Yes, Specify Location and Precautions to be Taken:

Underground Utilities: Yes

Utility Location Service: Underground utilities are present although no additional excavating will take place - thus, utilities will not be located

Name of Contact:

Phone Number:

Precautions to be Taken:

Other hazards: none

G. SITE CONTROL (1910.120(d))

Work Zones have been established as shown on the attached **Site Diagram**.
Site Security: Security on site will be maintained by: Chemetco, Inc. Security Office

____ Temporary Barricades and/or Warning Tape

____ Security Fence

Yes 24 Hour Security Guard

____ Other: _

H. PERSONAL PROTECTIVE EQUIPMENT (1910.120(b)(4))

Based on Evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work zone

WORK ZONE	LEVEL OF PROTECTION	REQUIRED PROTECTIVE EQUIPMENT: (specify exact type, Ex. PVC gloves)	
Exclusion Zone	C	Respirator:	full-facepiece air purifying
		Filters/Cartridges:	HEPA
		Boots:	rubber boots if in soil, steel-toed boots otherwise
		Inner Gloves:	latex (if desired)
		Outer Gloves:	Rubber
		Protective Coverall:	tyvek suit (if deemed necessary by on-site Safety Officer)

Hard Hat:	yes
Eye Protection:	safety glasses
Other:	

WORK ZONE	LEVEL OF PROTECTION	REQUIRED PROTECTIVE EQUIPMENT	
Contamination Reduction Zone	D	Respirator:	none
		Filters/Cartridges:	none
		Boots:	steel-toed boots
		Inner Gloves:	none
		Outer Gloves:	none
		Protective Coverall:	none
		Hard Hat:	yes
		Eye Protection:	safety glasses
		Other:	

Exceptions and Modifications:

DECONTAMINATION (1910.120(k))

Personnel Decontamination Procedures: All personnel entering the exclusion zone shall undergo decontamination prior to leaving the site. Personne shall proceed through the following decontamination stations:

Decon Station:	#1	#2	#3
Decon Procedure	remove PPE and place into disposable container		
Decon Equipment:	wash with soap and water and air dry, place waste in plastic bags for disposal		

Equipment Decontamination:

Gross Removal By: Scraping

Decon Solution: Alconox and water

Decontamination Rinsate:

Collection Method: Equipment decontamination shall take place on existing decon pad near Zinc Oxide spill area. Water will be collected and containerized for disposal into the plant.

posal Method, Firm: Decon water to be disposed of in ponds in the plant.

AMBIENT AIR MONITORING (1910.120(b)(4))

No air monitoring is proposed since respiratory protection is being used.

Activity	Instruments	Action Level	Frequency

Comments: _

K. **PERSONNEL AIR MONITORING** (1910.120(h))

No air monitoring is proposed since respiratory protection is being used.

Activity/Location	Contaminant(s)	NIOSH/OSHA Protocol

L. **CONTINGENCY PLAN** (1910.120(l))

Emergency Communication Signals: none

Emergency Escape Routes: West on Oldenburg Road to Route 3

Emergency Equipment on Site: (Location)

First Aid Kit: CSD Environmental Truck

Fire Extinguisher: CSD Environmental Truck

Telephone: Mobile Number 217/725-3979

Eye Wash/Safety Shower: Chemetco, Inc.

Other:

First Aid Measures:

In the event that personnel exposure symptoms occur the following procedures will be used:

Eye contact: Flush eye immediately with copious amount of water repeat until irritation is eliminated. If prolonged irritation occurs for mo than fifteen minutes, seek medical attention.

Skin contact: Wash exposed area with soap and water. If dermatitis or severe reddening occurs seek medical attention.

Inhalation: Remove person into fresh air, if symptoms occurs for more than 15 minutes seek medical attention.

Ingestion: Do not induce vomiting, seek immediate medical attention.

Flammable Conditions

None present.

Re-entry to the exclusion zone after an on-site emergency shall not be permitted until the following conditions are satisfied:

1) The conditions creating the emergency have been corrected.
2) The hazard(s) have been re-evaluated.
3) The site safety plan has been reviewed and determined adequate for the hazards encountered.
4) All site personnel have been instructed in any new hazards and changes to the site safety plan.

SIGN-OFF

All personnel, including subcontractor employees, have read the above plan and are familiar with its provisions. By signing below, all personnel are indicating they have received and are current with their medical surveillance and training certification; in accordance with 29 CFR (OSHA) 1910.120.

Name	Signature
Cindy Davis	
Marc Simmering	
Brock Reinhardt	
Greg Cotten	

UTILITIES:

Electric: _____

Gas: _____

→ Chemetco FAX (618)254-0138

U.S. EPA Region 5

Outline of Corrective Action Requirements
Chemetco, Hartford, IL

Issues for Comprehensive RCRA Consent Decree

1. **Interim Measures**:

   A. **Zinc Oxide Bunker**, prevention of infiltration to Bunker.
   Urgent need for some sort of engineered cover (tarp) or soil cover along with a water management system.

   B. **Slag Piles**, suppression of dust
   Dust suppression system, dedicated sprinkler system above waste slag piles.

2. **Description of Current Conditions Report (DOCC)**, summarizes the investigations and remedial actions up to the current date. Provides a baseline of site conditions.

3. Subsequent to the upcoming Consent Decree a **RCRA Facility Investigation (RFI)** will be done that covers the entire site. The RFI should define the nature and extent of the contamination, characterize the potential pathways of contaminant migration, and identify potential human and /or ecological receptors. New data should be combined with existing data to characterize the whole site. Chemetco will submit a RFI Workplan for Agency approval before implementation of the RFI.

   The RFI should focus on the following waste sites:

   A. Waste Slag Piles

   HWMA< B. Zinc Oxide Bunker – RCRA Unit (submitted some closure plans)

   C. Any unaddressed portions of Long Lake

   D. Parking Lot Fill (waste slag)

   HWMU< E. ~~Former on-site canal~~ – water and sediments

? F. Non-Contact Cooling Water Pond

? G. North and South Canal

? H. On-Site Zinc Oxide Pits

? I. Acid Wash Impoundment and Acid Storage Tank Area

swmu J. South Wetland Area

swmu K. Baghouse Dust Releases

swmu L. East Runoff Area crop / scrap

4. **Corrective Measure Study (CMS)** identifies potential corrective measures, including any innovative technologies, that may be used for containment, treatment, and/or disposal of contamination.

Statement of Basis/Public Comment (U.S. EPA)

5. **Corrective Measure Implementation (CMI)** details the design, construction, operation and maintenance, and monitoring of corrective measures at the site. Chemetco will submit a CMI Workplan for Agency approval before implementation of the CMI.

Key : i=IRIS n=NCEA h=HEAST x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION									CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS (Migration to Ground Water)	
SF o 1/(mg/kg-d)		RfDo (mg/kg-d)		GIF 1/(mg/kg-d)		RfDi (mg/kg-d)		CLass	CAS No.	Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
4.6E-002	h			4.6E-002	r			0	0.10	101-61-1	4,4'-Methylene bis(N,N'-dimethyl)aniline	1.1E+001	ca	5.4E+001	ca	1.5E-001	ca	1.5E+000	ca		
		1.0E-002	h			1.0E-002	r	1		74-95-3	Methylene bromide	6.7E+001	nc	2.4E+002	nc	3.7E+001	nc	6.1E+001	nc		
7.5E-003	i	6.0E-002	i	1.6E-003	i	8.6E-001	h	1		75-09-2	Methylene chloride	8.9E+000	ca	2.1E+001	ca	4.1E+000	ca	4.3E+000	ca	2.0E-002	1.0E-003
		1.7E-004	r			1.7E-004	r	0	0.10	101-68-8	4,4'-Methylene diphenyl diisocyanate	1.0E+001	nc	1.5E+002	nc	6.2E-001	nc	6.2E+000	nc		
		6.0E-001	i			2.9E-001	i	1		78-93-3	Methyl ethyl ketone	7.3E+003	nc	2.6E+004	nc	1.0E+003	nc	1.9E+003	nc		
1.1E+000	h			1.1E+000	r			0	0.10	60-34-4	Methyl hydrazine	4.4E-001	ca	2.2E+000	ca	6.1E-003	ca	6.1E-002	ca		
		8.0E-002	h			2.3E-002	h	1		108-10-1	Methyl isobutyl ketone	7.8E+002	nc	2.9E+003	nc	8.3E+001	nc	1.6E+002	nc		
		5.7E-004	r			5.7E-004	n	0	0.10	74-93-1	Methyl Mercaptan	3.5E+001	nc	5.0E+002	nc	2.1E+000	nc	2.1E+001	nc		
		1.4E-000	i			2.0E-001	i	1		80-62-6	Methyl methacrylate	2.2E+003	nc	2.7E+003	sat	7.3E+002	nc	1.4E+003	nc		
3.3E-002	h			3.3E-002	r			0	0.10	99-55-8	2-Methyl-5-nitroaniline	1.5E+001	ca	7.5E+001	ca	2.0E-001	ca	2.0E+000	ca		
		2.5E-004	i			2.5E-004	r	0	0.10	298-00-0	Methyl parathion	1.5E+001	nc	2.2E+002	nc	9.1E-001	nc	9.1E+000	nc		
		5.0E-002	i			5.0E-002	r	0	0.10	95-48-7	2-Methylphenol	3.1E+003	nc	4.4E+004	nc	1.6E+002	nc	1.6E+003	nc	1.5E+001	8.0E-001
		5.0E-002	i			5.0E-002	r	0	0.10	108-39-4	3-Methylphenol	3.1E+003	nc	4.4E+004	nc	1.6E+002	nc	1.6E+003	nc		
		5.0E-003	h			5.0E-003	r	0	0.10	106-44-5	4-Methylphenol	3.1E+002	nc	4.4E+003	nc	1.6E+001	nc	1.6E+002	nc		
		2.0E-002	n			2.0E-002	r	0	0.10	993-13-5	Methyl phosphonic acid	1.2E+003	nc	1.8E+004	nc	7.3E+001	nc	7.3E+002	nc		
		6.0E-003	h			1.1E-002	h	1		25013-15-4	Methyl styrene (mixture)	1.3E+002	nc	5.6E+002	nc	4.2E+001	nc	6.0E+001	nc		
		7.0E-002	h			7.0E-002	r	1		98-83-9	Methyl styrene (alpha)	6.8E+002	sat	6.8E+002	sat	2.6E+002	nc	4.3E+002	nc		
						8.6E-001	i	1		1634-04-4	Methyl tertbutyl ether (MTBE)					3.1E+003	nc	2.0E+001	nc/ca		
		1.5E-001	i			1.5E-001	r	0	0.10	51218-45-2	Metolachor (Dual)	9.2E+003	nc	1.0E+005	max	5.5E+002	nc	5.5E+003	nc		
		2.5E-002	i			2.5E-002	r	0	0.10	21087-64-9	Metribuzin	1.5E+003	nc	2.2E+004	nc	9.1E+001	nc	9.1E+002	nc		
1.8E+000	v	2.0E-004	i	1.8E+000	r	2.0E-004	r	0	0.10	2385-85-5	Mirex	2.7E-001	ca*	1.4E+000	ca	3.7E-003	ca	3.7E-002	ca		
		2.0E-003	i			2.0E-003	r	0	0.10	2212-67-1	Molinate	1.2E+002	nc	1.8E+003	nc	7.3E+000	nc	7.3E+001	nc		
		5.0E-003	h					0		7439-98-7	Molybdenum	3.9E+002	nc	1.0E+004	nc			1.8E+002	nc		
		1.0E-001	h			1.0E-001	h	0	0.10	10599-90-3	Monochloramine	8.1E+003	nc	8.8E+004	nc	3.7E+002	nc	3.6E+003	nc		
		2.0E-003	i			2.0E-003	r	0	0.10	300-76-5	Naled	1.2E+002	nc	1.8E+003	nc	7.3E+000	nc	7.3E+001	nc		
		1.0E-001	i			1.0E-001	r	0	0.10	15299-99-7	Napropamide	8.1E+003	nc	8.8E+004	nc	3.7E+002	nc	3.6E+003	nc		
		2.0E-002	i					0		7440-02-0	Nickel (soluble salts)	1.6E+003	nc	4.1E+004	nc			7.3E+002	nc	1.3E+002	7.0E+000
											"CAL-Modified PRG" (PEA, 1994)	1.5E+002									
				8.4E-001	i			0			Nickel refinery dust					8.0E-003	ca				
				1.7E+000	i			0		12035-72-2	Nickel subsulfide			1.1E+004	ca	4.0E-003	ca				
		1.5E-003	x			1.5E-003	r	0	0.10	1929-82-4	Nitrapyrin	9.2E+001	nc	1.3E+003	nc	5.5E+000	nc	5.5E+001	nc		
Tap Water PRG Based on Infant NOAEL (see IRIS)										14797-55-8	Nitrate							1.0E+004	nc		
		1.0E-001	x							10102-43-9	Nitric Oxide	7.8E+003	nc	1.0E+005	max			3.6E+003	nc		
Tap Water PRG Based on Infant NOAEL (see IRIS)										14797-65-0	Nitrite							1.0E+003	nc		
		5.7E-005	r			5.7E-005	h	0	0.10	88-74-4	2-Nitroaniline	3.5E+000	nc	5.0E+001	nc	2.1E-001	nc	2.1E+000	nc		
		5.0E-004	i			5.7E-004	h	1		98-95-3	Nitrobenzene	2.0E+001	nc	1.1E+002	nc	2.1E+000	nc	3.4E+000	nc	1.0E-001	7.0E-003
		7.0E-002	h			7.0E-002	r	0	0.10	67-20-9	Nitrofurantoin	4.3E+003	nc	6.2E+004	nc	2.6E+002	nc	2.6E+003	nc		
1.5E+000	h			9.4E+000	h			0	0.10	59-87-0	Nitrofurazone	3.2E-001	ca	1.6E+000	ca	7.2E-004	ca	4.5E-002	ca		
1.4E-002	o			1.4E-002	r			0	0.10	55-63-0	Nitroglycerin	3.5E+001	ca	1.8E+002	ca	4.8E-001	ca	4.8E+000	ca		
		1.0E-001	r			1.0E-001	r	0	0.10	556-88-7	Nitroguanidine	6.1E+003	nc	8.8E+004	nc	3.7E+002	nc	3.6E+003	nc		
		8.0E-003	n			8.0E-003	r	0	0.10	100-02-7	4-Nitrophenol	4.9E+002	nc	7.0E+003	nc	2.9E+001	nc	2.9E+002	nc		
9.4E+000	r	5.7E-003	r	9.4E+000	h	5.7E-003	r	1		79-46-9	2-Nitropropane					7.2E-004	ca	1.2E-003	ca		
5.4E+000	i			5.4E+000	i			1		924-16-3	N-Nitrosodi-n-butylamine	2.4E-002	ca	8.1E-002	ca	1.2E-003	ca	2.0E-003	ca		
2.8E+000	i			2.8E+000	r			0	0.10	1116-54-7	N-Nitrosodiethanolamine	1.7E-001	ca	8.8E-001	ca	2.4E-003	ca	2.4E-002	ca		
1.5E-002	i			1.5E+002	i			0	0.10	55-18-5	N-Nitrosodiethylamine	3.2E-003	ca	1.6E-002	ca	4.5E-005	ca	4.5E-004	ca		
5.1E+001	i			4.8E+001	i			0	0.10	62-75-9	N-Nitrosodimethylamine	9.5E-003	ca	4.8E-002	ca	1.4E-004	ca	1.3E-003	ca		
4.9E-003	i			4.9E-003	r			0	0.10	86-30-6	N-Nitrosodiphenylamine	9.9E+001	ca	5.0E+002	ca	1.4E+000	ca	1.4E+001	ca	1.0E+000	6.0E-002
7.0E+000	i			7.0E+000	r			0	0.10	621-64-7	N-Nitroso di-n-propylamine	6.8E-002	ca	3.5E-001	ca	9.6E-004	ca	9.6E-003	ca	5.0E-005	2.0E-006
2.2E+001	i			2.2E+001	r			0	0.10	10595-95-6	N-Nitroso-N-methylethylamine	2.2E-002	ca	1.1E-001	ca	3.1E-004	ca	3.1E-003	ca		
2.1E+000	i			2.1E+000	i			0	0.10	930-55-2	N-Nitrosopyrrolidine	2.3E-001	ca	1.2E+000	ca	3.1E-003	ca	3.2E-002	ca		
		1.0E-002	h			1.0E-002	r	1		99-08-1	m-Nitrotoluene	3.7E+002	nc	1.0E+003	sat	3.7E+001	nc	6.1E+001	nc		
		1.0E-002	h			1.0E-002	r	1		88-72-2	o-Nitrotoluene	3.7E+002	nc	1.0E+003	sat	3.7E+001	nc	6.1E+001	nc		
		1.0E-002	h			1.0E-002	r	1		99-99-0	p-Nitrotoluene	3.7E+002	nc	1.0E+003	sat	3.7E+001	nc	6.1E+001	nc		
		4.0E-002	i			4.0E-002	r	0	0.10	27314-13-2	Norflurazon	2.4E+003	nc	3.5E+004	nc	1.5E+002	nc	1.5E+003	nc		

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FOR PLANNING PURPOSES

TOXICITY INFORMATION									CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
																		Migration to Ground Water	
Sfo (mg/kg-d)-1		RfDo (mg/kg-d)		Sfi (mg/kg-d)-1		RfDi (mg/kg-d)			CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m3)		Tap Water (ug/l)		DAF 20 mg/kg	DAF 1 mg/kg
		4.0E-002	h			4.0E-002	r	0	0.10	123-31-9	p-Hydroquinone	2.4E+03	nc	3.5E+04	nc	1.5E+02	nc	1.5E+03	nc		
		1.3E-002	i			1.3E-002	r	0	0.10	35554-44-0	Imazalil	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
		2.5E-001	i			2.5E-001	r	0	0.10	81335-37-7	Imazaquin	1.5E+04	nc	1.0E+05	max	9.1E+02	nc	9.1E+03	nc		
		4.0E-002	i			4.0E-002	r	0	0.10	36734-19-7	Iprodione	2.4E+03	nc	3.5E+04	nc	1.5E+02	nc	1.5E+03	nc		
		3.0E-001	n					0		7439-89-6	Iron	2.3E+04	nc	1.0E+05	max			1.1E+04	nc		
		3.0E-001	i			3.0E-001	r	1		78-83-1	Isobutanol	1.3E+04	nc	4.0E+04	sat	1.1E+03	nc	1.8E+03	nc		
9.5E-004	r	2.0E-001	i	9.5E-004	r	2.0E-001	r	0	0.10	78-59-1	Isophorone	5.1E+02	ca*	2.6E+03	ca*	7.1E+00	ca	7.1E+01	ca	5.0E-001	3.0E-002
		1.5E-002	i			1.5E-002	r	0	0.10	33820-53-0	Isopropalin	9.2E+02	nc	1.3E+04	nc	5.5E+01	nc	5.5E+02	nc		
		1.0E-001	i			1.1E-001	r	0	0.10	1832-54-8	Isopropyl methyl phosphonic acid	6.1E+03	nc	8.8E+04	nc	4.0E+02	nc	3.6E+03	nc		
		5.0E-002	i			5.0E-002	r	0	0.10	82558-50-7	Isoxaben	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
1.8E+001	n			1.8E+001	r			0	0.10	143-50-0	Kepone	2.7E-002	ca	1.4E-001	ca	3.7E-004	ca	3.7E-003	ca		
		2.0E-003	i			2.0E-003	r	0	0.10	77501-63-4	Lactofen	1.2E+02	nc	1.8E+03	nc	7.3E+000	nc	7.3E+001	nc		
PRGs Based on EPA Models, IEUBK (1994) and TRW (1996)										7439-92-1	Lead	4.0E+02	nc	1.0E+03	nc						
		1.0E-007	i					0	0.10	78-00-2	Lead (tetraethyl)	6.1E-003	nc	8.8E-002	nc			3.6E-003	nc		
		2.0E-003	i			2.0E-003	r	0	0.10	330-55-2	Linuron	1.2E+02	nc	1.8E+03	nc	7.3E+000	nc	7.3E+001	nc		
		2.0E-002	x					0		7439-93-2	Lithium	1.6E+03	nc	4.1E+04	nc			7.3E+002	nc		
		2.0E-001	i			2.0E-001	r	0	0.10	83055-99-6	Londax	1.2E+04	nc	1.0E+05	max	7.3E+002	nc	7.3E+003	nc		
		2.0E-002	i			2.0E-002	r	0	0.10	121-75-5	Malathion	1.2E+03	nc	1.8E+04	nc	7.3E+001	nc	7.3E+002	nc		
		1.0E-001	i			1.0E-001	r	0	0.10	108-31-6	Maleic anhydride	6.1E+03	nc	8.8E+04	nc	3.7E+002	nc	3.6E+003	nc		
		5.0E-001	i			5.0E-001	r	1		123-33-1	Maleic hydrazide	1.7E+03	nc	2.4E+03	sat	1.8E+003	nc	3.0E+003	nc		
		2.0E-005	h			2.0E-005	r	0	0.10	109-77-3	Malononitrile	1.2E+000	nc	1.8E+001	nc	7.3E-002	nc	7.3E-001	nc		
		3.0E-002	h			3.0E-002	r	0	0.10	8018-01-7	Mancozeb	1.8E+003	nc	2.6E+004	nc	1.1E+002	nc	1.1E+003	nc		
8.0E-002	o	5.0E-003	i	8.0E-002	i	5.0E-003	r	0	0.10	12427-38-2	Maneb	8.1E+000	ca*	4.1E+001	ca	1.1E-001	ca	1.1E+000	ca		
		1.4E-005	i			1.4E-005	i	0		7439-96-5	Manganese and compounds	1.8E+003	nc	3.2E+004	nc	5.1E-002	nc	8.8E+002	nc		
		9.0E-005	h			9.0E-005	r	0	0.10	950-10-7	Mephosfolan	5.5E+000	nc	7.9E+001	nc	3.3E-001	nc	3.3E+000	nc		
		3.0E-002	i			3.0E-002	r	0	0.10	24307-26-4	Mepiquat	1.8E+003	nc	2.6E+004	nc	1.1E+002	nc	1.1E+003	nc		
2.9E-002	n	1.0E-001	n	2.9E-002	i	1.0E-001	r	0	0.10	149-30-4	2-Mercaptobenzothiazole	1.7E+001	ca	8.5E+001	ca	2.3E-001	ca	2.3E+000	ca		
		3.0E-004	i					0		7487-94-7	Mercury and compounds	2.3E+001	nc	6.1E+002	nc			1.1E+001	nc		
						8.6E-005	i			7439-97-6	Mercury (elemental)					3.1E-001	nc				
		1.0E-004	i					0	0.10	22967-92-6	Mercury (methyl)	6.1E+000	nc	8.8E+001	nc			3.6E+000	nc		
		3.0E-005	i			3.0E-005	r	0	0.10	150-50-5	Merphos	1.8E+000	nc	2.6E+001	nc	1.1E-001	nc	1.1E+000	nc		
		3.0E-005	i			3.0E-005	r	0	0.10	78-48-8	Merphos oxide	1.8E+000	nc	2.6E+001	nc	1.1E-001	nc	1.1E+000	nc		
		6.0E-002	i			6.0E-002	r	0	0.10	57837-19-1	Metalaxyl	3.7E+003	nc	5.3E+004	nc	2.2E+002	nc	2.2E+003	nc		
		1.0E-004	i			2.0E-004	h	1		126-98-7	Methacrylonitrile	2.1E+000	nc	8.8E+000	nc	7.3E-001	nc	1.0E+000	nc		
		5.0E-005	i			5.0E-005	r	0	0.10	10265-92-6	Methamidophos	3.1E+000	nc	4.4E+001	nc	1.8E-001	nc	1.8E+000	nc		
		5.0E-001	i			5.0E-001	r	0	0.10	67-56-1	Methanol	3.1E+004	nc	1.0E+005	max	1.8E+003	nc	1.8E+004	nc		
		1.0E-003	i			1.0E-003	r	0	0.10	950-37-8	Methidathion	6.1E+001	nc	8.8E+002	nc	3.7E+000	nc	3.6E+001	nc		
		2.5E-002	i			2.5E-002	r	1		16752-77-5	Methomyl	4.4E+001	nc	1.5E+002	nc	9.1E+001	nc	1.5E+002	nc		
		5.0E-003	i			5.0E-003	r	0	0.10	72-43-5	Methoxychlor	3.1E+002	nc	4.4E+003	nc	1.8E+001	nc	1.8E+002	nc	1.6E+002	6.0E+000
		1.0E-003	h			5.7E-003	i	0	0.10	109-86-4	2-Methoxyethanol	6.1E+001	nc	8.8E+002	nc	2.1E+001	nc	3.6E+001	nc		
		2.0E-003	h			2.0E-003	r	0	0.10	110-49-6	2-Methoxyethanol acetate	1.2E+002	nc	1.8E+003	nc	7.3E+000	nc	7.3E+001	nc		
4.0E-002	h			4.6E-002	r			0	0.10	99-59-2	2-Methoxy-5-nitroaniline	1.1E+001	ca	5.4E+001	ca	1.5E-001	ca	1.5E+000	ca		
		1.0E+000	h			1.0E+000	r	1		79-20-9	Methyl acetate	2.2E+004	nc	9.6E+004	nc	3.7E+003	nc	6.1E+003	nc		
		3.0E-002	h			3.0E-002	r	1		96-33-3	Methyl acrylate	7.0E+001	nc	2.3E+002	nc	1.1E+002	nc	1.8E+002	nc		
2.4E-001	h			2.4E-001	r			0	0.10	95-53-4	2-Methylaniline (o-toluidine)	2.0E+000	ca	1.0E+001	ca	2.8E-002	ca	2.8E-001	ca		
1.8E-001	h			1.8E-001	r			0	0.10	636-21-5	2-Methylaniline hydrochloride	2.7E+000	ca	1.4E+001	ca	3.7E-002	ca	3.7E-001	ca		
		1.0E+000	x			1.0E+000	r	0	0.10	79-22-1	Methyl chlorocarbonate	6.1E+004	nc	1.0E+005	max	3.7E+003	nc	3.6E+004	nc		
		5.0E-004	i			5.0E-004	r	0	0.10	94-74-6	2-Methyl-4-chlorophenoxyacetic acid	3.1E+001	nc	4.4E+002	nc	1.8E+000	nc	1.8E+001	nc		
		1.0E-002	i			1.0E-002	r	0	0.10	94-81-5	4-(2-Methyl-4-chlorophenoxy) butyric acid	6.1E+002	nc	8.8E+003	nc	3.7E+001	nc	3.6E+002	nc		
		1.0E-003	i			1.0E-003	r	0	0.10	93-65-2	2-(2-Methyl-4-chlorophenoxy) propionic acid	6.1E+001	nc	8.8E+002	nc	3.7E+000	nc	3.6E+001	nc		
		1.0E-003	i			1.0E-003	r	0	0.10	16484-77-8	2-(2-Methyl-1,4-chlorophenoxy) propionic acid	6.1E+001	nc	8.8E+002	nc	3.7E+000	nc	3.6E+001	nc		
		8.6E-001	r			8.6E-001	h	1		108-87-2	Methylcyclohexane	2.6E+003	nc	8.8E+003	nc	3.1E+003	nc	5.2E+003	nc		
2.9E-001	h			2.9E-001	r			0	0.10	101-77-9	4,4'-Methylenebisbenzeneamine	1.9E+000	ca	9.9E+000	ca	2.7E-002	ca	2.7E-001	ca		
1.3E-001	h	7.0E-004	h	1.3E-001	h	7.0E-004	r	0	0.10	101-14-4	4,4'-Methylene bis(2-chloroaniline)	3.7E+000	ca*	1.9E+001	ca*	5.2E-002	ca*	5.2E-001	ca*		

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FOR PLANNING PURPOSES

TOXICITY INFORMATION									CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
																		Migration to Ground Water	
SFo (1/(mg/kg-d))		RfDo (mg/kg-d)		SFi (1/(mg/kg-d))		RfDi (mg/kg-d)		VF soil (cm³/g)	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m³)		Tap Water (ug/l)		DAF 1 (mg/kg)	DAF 20 (mg/kg)
7.3E-003	n			3.1E-003	n			0	218-01-9	Chrysene	6.2E+001	ca	2.9E+002	ca	2.2E+000	ca	9.2E+000	ca	1.6E+002	8.0E+000
										"CAL-Modified PRG" (PEA, 1994)	6.1E+000									
7.3E+000	n			3.1E+000	n			0	53-70-3	Dibenz[ah]anthracene	6.2E-002	ca	2.9E-001	ca	2.2E-003	ca	9.2E-003	ca	2.0E+000	8.0E-002
		4.0E-002	i			4.0E-002	r	0	206-44-0	Fluoranthene	2.3E+003	nc	3.0E+004	nc	1.5E+002	nc	1.5E+003	nc	4.3E+003	2.1E+002
		4.0E-002	i			4.0E-002	r	1	86-73-7	Fluorene	2.6E+003	nc	3.3E+004	nc	1.5E+002	nc	2.4E+002	nc	5.6E+002	2.8E+001
7.3E-001	n			3.1E-001	n			0	193-39-5	Indeno[1,2,3-cd]pyrene	6.2E-001	ca	2.9E+000	ca	2.2E-002	ca	9.2E-002	ca	1.4E+001	7.0E-001
		2.0E-002	i			8.6E-004	i	1	91-20-3	Naphthalene	5.6E+001	nc	1.9E+002	nc	3.1E+000	nc	6.2E+000	nc	8.4E+001	4.0E+000
		3.0E-002	i			3.0E-002	r	1	129-00-0	Pyrene	2.3E+003	nc	5.4E+004	nc	1.1E+002	nc	1.8E+002	nc	4.2E+003	2.1E+002
1.5E-001	r	9.0E-003	i	1.5E-001	r	9.0E-003	r	0	67747-09-5	Prochloraz	3.2E+000	ca	1.6E+001	ca	4.5E-002	ca	4.5E-001	ca		
		6.0E-003	h			6.0E-003	r	0	26399-36-0	Profluralin	3.7E+002	nc	5.3E+003	nc	2.2E+001	nc	2.2E+002	nc		
		1.5E-002	i			1.5E-002	r	0	1610-18-0	Prometon	9.2E+002	nc	1.3E+004	nc	5.5E+001	nc	5.5E+002	nc		
		4.0E-003	i			4.0E-003	r	0	7287-19-6	Prometryn	2.4E+002	nc	3.5E+003	nc	1.5E+001	nc	1.5E+002	nc		
		7.5E-002	i			7.5E-002	r	0	23950-58-5	Pronamide	4.6E+003	nc	6.6E+004	nc	2.7E+002	nc	2.7E+003	nc		
		1.3E-002	i			1.3E-002	r	0	1918-16-7	Propachlor	7.9E+002	nc	1.1E+004	nc	4.7E+001	nc	4.7E+002	nc		
		5.0E-003	i			5.0E-003	r	0	709-98-8	Propanil	3.1E+002	nc	4.4E+003	nc	1.8E+001	nc	1.8E+002	nc		
		2.0E-002	i			2.0E-002	r	0	2312-35-8	Propargite	1.2E+003	nc	1.8E+004	nc	7.3E+001	nc	7.3E+002	nc		
		2.0E-003	i			2.0E-003	r	0	107-19-7	Propargyl alcohol	1.2E+002	nc	1.8E+003	nc	7.3E+000	nc	7.3E+001	nc		
		2.0E-002	i			2.0E-002	r	0	139-40-2	Propazine	1.2E+003	nc	1.8E+004	nc	7.3E+001	nc	7.3E+002	nc		
		2.0E-002	i			2.0E-002	r	0	122-42-9	Propham	1.2E+003	nc	1.8E+004	nc	7.3E+001	nc	7.3E+002	nc		
		1.3E-002	i			1.3E-002	r	0	60207-90-1	Propiconazole	7.9E+002	nc	1.1E+004	nc	4.7E+001	nc	4.7E+002	nc		
		1.0E-001	i			1.1E-001	i	1	98-82-8	Isopropylbenzene (Cumene)	1.6E+002	nc	5.2E+002	nc	4.0E+002	nc	6.6E+002	nc		
		1.0E-002	n			1.0E-002	r	1	103-65-1	n-Propylbenzene	1.4E+002	nc	2.4E+002	sat	3.7E+001	nc	6.1E+001	nc		
		2.0E+001	h			2.0E+001	r	0	57-55-6	Propylene glycol	1.0E+005	max	1.0E+005	max	7.3E+004	nc	7.3E+005	nc		
		7.0E-001	h			7.0E-001	r	0	111-35-3	Propylene glycol, monoethyl ether	4.3E+004	nc	1.0E+005	max	2.6E+003	nc	2.6E+004	nc		
		7.0E-001	h			5.7E-001	r	0	107-98-2	Propylene glycol, monomethyl ether	4.3E+004	nc	1.0E+005	max	2.1E+003	nc	2.6E+004	nc		
2.4E-001	r	8.6E-003	r	1.3E-002	r	8.6E-003	r	1	75-56-9	Propylene oxide	1.9E+000	ca*	9.1E+000	ca*	5.2E-001	ca*	2.2E-001	ca		
		2.5E-001	i			2.5E-001	i	0	81335-77-5	Pursuit	1.5E+004	nc	1.0E+005	max	9.1E+002	nc	9.1E+003	nc		
		2.5E-002	i			2.5E-002	r	0	51630-58-1	Pydrin	1.5E+003	nc	2.2E+004	nc	9.1E+001	nc	9.1E+002	nc		
		1.0E-003	i			1.0E-003	r	0	110-86-1	Pyridine	6.1E+001	nc	8.6E+002	nc	3.7E+000	nc	3.6E+001	nc		
		5.0E-004	i			5.0E-004	r	0	13593-03-8	Quinalphos	3.1E+001	nc	4.4E+002	nc	1.8E+000	nc	1.8E+001	nc		
1.2E+001	h			1.2E+001	r			0	91-22-5	Quinoline	4.1E-002	ca	2.1E-001	ca	5.6E-004	ca	5.6E-003	ca		
1.1E-001	i	3.0E-003	i	1.1E-001	r	3.0E-003	r	0	121-82-4	RDX (Cyclonite)	4.4E+000	ca*	2.2E+001	ca	6.1E-002	ca	6.1E-001	ca		
		3.0E-002	i			3.0E-002	r	0	10453-86-8	Resmethrin	1.8E+003	nc	2.6E+004	nc	1.1E+002	nc	1.1E+003	nc		
		5.0E-002	h			5.0E-002	r	0	299-84-3	Ronnel	3.1E+003	nc	4.4E+004	nc	1.8E+002	nc	1.8E+003	nc		
		4.0E-003	i			4.0E-003	r	0	83-79-4	Rotenone	2.4E+002	nc	3.5E+003	nc	1.5E+001	nc	1.5E+002	nc		
		2.5E-002	i			2.5E-002	r	0	78587-05-0	Savey	1.5E+003	nc	2.2E+004	nc	9.1E+001	nc	9.1E+002	nc		
		5.0E-003	i					0	0.10	7783-00-8	Selenious Acid	3.1E+002	nc	4.4E+003	nc			1.8E+002	nc		
		5.0E-003	i					0		7782-49-2	Selenium	3.9E+002	nc	1.0E+004	nc			1.8E+002	nc	5.0E+000	3.0E-001
		5.0E-003	h					0	0.10	630-10-4	Selenourea	3.1E+002	nc	4.4E+003	nc			1.8E+002	nc		
		9.0E-002	i			9.0E-002	r	0	0.10	74051-80-2	Sethoxydim	5.5E+003	nc	7.9E+004	nc	3.3E+002	nc	3.3E+003	nc		
		5.0E-003	i					0		7440-22-4	Silver and compounds	3.9E+002	nc	1.0E+004	nc			1.8E+002	nc	3.4E+001	2.0E+000
1.2E-001	h	5.0E-003	i	1.2E-001	r	2.0E-003	r	0	0.10	122-34-9	Simazine	4.1E+000	ca*	2.1E+001	ca	5.6E-002	ca	5.6E-001	ca		
		4.0E-003	i			4.0E-003	r	0	0.10	26628-22-8	Sodium azide	2.4E+002	nc	3.5E+003	nc	1.5E+001	nc	1.5E+002	nc		
2.7E-001	h	3.0E-002	i	2.7E-001	r	3.0E-002	r	0	0.10	148-18-5	Sodium diethyldithiocarbamate	1.8E+000	ca	9.1E+000	ca	2.6E-002	ca	2.5E-001	ca		
		2.0E-005	i			2.0E-005	r	0	0.10	62-74-8	Sodium fluoroacetate	1.2E+000	nc	1.8E+001	nc	7.3E-002	nc	7.3E-001	nc		
		1.0E-003	h			1.0E-003	r	0	0.10	13718-26-8	Sodium metavanadate	6.1E+001	nc	8.8E+002	nc	3.7E+000	nc	3.6E+001	nc		
		6.0E-001	i					0		7440-24-6	Strontium, stable	4.7E+004	nc	1.0E+005	max			2.2E+004	nc		
		3.0E-004	i			3.0E-004	r	0	0.10	57-24-9	Strychnine	1.8E+001	nc	2.6E+002	nc	1.1E+000	nc	1.1E+001	nc		
		2.0E-001	i			2.9E-001	i	1		100-42-5	Styrene	1.7E+003	sat	1.7E+003	sat	1.1E+003	nc	1.6E+003	nc	4.0E+000	2.0E-001
		2.5E-002	i			2.5E-002	r	0	0.10	88671-89-0	Systhane	1.5E+003	nc	2.2E+004	nc	9.1E+001	nc	9.1E+002	nc		
1.5E+005	h			1.5E+005	h			0	0.03	1746-01-6	2,3,7,8-TCDD (dioxin)	3.9E-006	ca	2.7E-005	ca	4.6E-008	ca	4.5E-007	ca		
		7.0E-002	i			7.0E-002	r	0	0.10	34014-18-1	Tebuthiuron	4.3E+003	nc	6.2E+004	nc	2.6E+002	nc	2.6E+003	nc		
		2.0E-002	h			2.0E-002	r	0	0.10	3383-96-8	Temephos	1.2E+003	nc	1.8E+004	nc	7.3E+001	nc	7.3E+002	nc		
		1.3E-002	i			1.3E-002	r	0	0.10	5902-51-2	Terbacil	7.9E+002	nc	1.1E+004	nc	4.7E+001	nc	4.7E+002	nc		

Key : i=IRIS n=NCEA h=HEAST a=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION									CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)							SOIL SCREENING LEVELS	
SF Oral (mg/kg-d)-1		RfDo (mg/kg-d)		CF 1 (mg/kg-d)		RfDi (mg/kg-d)			CAS No.	Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/L)		Migration to Ground Water
		7.0E-004	i			7.0E-004	r	0	0.10	85509-19-9	NuStar	4.3E+001	nc	6.2E+002	nc	2.6E+000	nc	2.6E+001	nc		
		3.0E-003	i			3.0E-003	r	0	0.10	32536-52-0	Octabromodiphenyl ether	1.8E+002	nc	2.6E+003	nc	1.1E+001	nc	1.1E+002	nc		
		5.0E-002	i			5.0E-002	r	0	0.10	2691-41-0	Octahydro-1357-tetranitro-1357- tetrazocine (HMX)	3.1E+003	nc	4.4E+004	nc	1.8E+002	nc	1.8E+003	nc		
		2.0E-003	h			2.0E-003	r	0	0.10	152-16-9	Octamethylpyrophosphoramide	1.2E+002	nc	1.8E+003	nc	7.3E+000	nc	7.3E+001	nc		
		5.0E-002	i			5.0E-002	r	0	0.10	19044-88-3	Oryzalin	3.1E+003	nc	4.4E+004	nc	1.8E+002	nc	1.8E+003	nc		
		5.0E-003	i			5.0E-003	r	0	0.10	19666-30-9	Oxadiazon	3.1E+002	nc	4.4E+003	nc	1.8E+001	nc	1.8E+002	nc		
		2.5E-002	i			2.5E-002	r	0	0.10	23135-22-0	Oxamyl	1.5E+003	nc	2.2E+004	nc	9.1E+001	nc	9.1E+002	nc		
		3.0E-003	i			3.0E-003	r	0	0.10	42874-03-3	Oxyfluorfen	1.8E+002	nc	2.6E+003	nc	1.1E+001	nc	1.1E+002	nc		
		1.3E-002	i			1.3E-002	r	0	0.10	76738-62-0	Paclobutrazol	7.9E+002	nc	1.1E+004	nc	4.7E+001	nc	4.7E+002	nc		
		4.5E-003	i			4.5E-003	r	0	0.10	4685-14-7	Paraquat	2.7E+002	nc	4.0E+003	nc	1.6E+001	nc	1.6E+002	nc		
		6.0E-003	h			6.0E-003	r	0	0.10	56-38-2	Parathion	3.7E+002	nc	5.3E+003	nc	2.2E+001	nc	2.2E+002	nc		
		5.0E-002	h			5.0E-002	r	0	0.10	1114-71-2	Pebulate	3.1E+003	nc	4.4E+004	nc	1.8E+002	nc	1.8E+003	nc		
		4.0E-007	r			4.0E-002	r	0	0.10	40487-42-1	Pendimethalin	2.4E+003	nc	3.5E+004	nc	1.5E+002	nc	1.5E+003	nc		
2.3E-002	h			2.3E-002	r			0	0.10	87-84-3	Pentabromo-6-chloro cyclohexane	2.1E+001	ca	1.1E+002	ca	2.9E-001	ca	2.9E+000	ca		
		2.0E-003	i			2.0E-003	r	0	0.10	32534-81-9	Pentabromodiphenyl ether	1.2E+002	nc	1.8E+003	nc	7.3E+000	nc	7.3E+001	nc		
		8.0E-004	i			8.0E-004	r	0	0.10	608-93-5	Pentachlorobenzene	4.9E+001	nc	7.0E+002	nc	2.9E+000	nc	2.9E+001	nc		
2.6E-001	h	3.0E-003	i	2.6E-001	r	3.0E-003	r	0	0.10	82-68-8	Pentachloronitrobenzene	1.9E+000	ca*	9.5E+000	ca	2.6E-002	ca	2.6E-001	ca		
1.2E-001	i	3.0E-002	i	1.2E-001	r	3.0E-002	r	0	0.25	87-86-5	Pentachlorophenol	3.0E+000	ca	1.1E+001	ca	5.6E-002	ca	5.6E-001	ca	3.0E-002	1.0E-003
		5.0E-004	z					0		7601-90-3	Perchlorate	3.9E+001	nc	1.0E+003	nc			1.8E+001	nc		
		5.0E-002	i			5.0E-002	r	0	0.10	52645-53-1	Permethrin	3.1E+003	nc	4.4E+004	nc	1.8E+002	nc	1.8E+003	nc		
		2.5E-001	i			2.5E-001	r	0	0.10	13684-63-4	Phenmedipham	1.5E+004	nc	1.0E+005	max	9.1E+002	nc	9.1E+003	nc		
		6.0E-001	i			6.0E-001	r	0	0.10	108-95-2	Phenol	3.7E+004	nc	1.0E+005	max	2.2E+003	nc	2.2E+004	nc	1.0E+002	5.0E+000
		2.0E-003	n			2.0E-003	r	0	0.10	92-84-2	Phenothiazine	1.2E+002	nc	1.8E+003	nc	7.3E+000	nc	7.3E+001	nc		
		6.0E-003	i			6.0E-003	r	0	0.10	108-45-2	m-Phenylenediamine	3.7E+002	nc	5.3E+003	nc	2.2E+001	nc	2.2E+002	nc		
		1.9E-001	h			1.9E-001	r	0	0.10	106-50-3	p-Phenylenediamine	1.2E+004	nc	1.0E+005	max	6.9E+002	nc	6.9E+003	nc		
		8.0E-005	i			8.0E-005	r	0	0.10	62-38-4	Phenylmercuric acetate	4.9E+000	nc	7.0E+001	nc	2.9E-001	nc	2.9E+000	nc		
1.9E-003	h			1.9E-003	r			0	0.10	90-43-7	2-Phenylphenol	2.5E+002	ca	1.3E+003	ca	3.5E+000	ca	3.5E+001	ca		
		2.0E-004	h			2.0E-004	r	0	0.10	298-02-2	Phorate	1.2E+001	nc	1.8E+002	nc	7.3E-001	nc	7.3E+000	nc		
		2.0E-002	i			2.0E-002	r	0	0.10	732-11-6	Phosmet	1.2E+003	nc	1.8E+004	nc	7.3E+001	nc	7.3E+002	nc		
		3.0E-004	h			8.6E-005	i	0	0.10	7803-51-2	Phosphine	1.8E+001	nc	2.6E+002	nc	3.1E-001	nc	1.1E+001	nc		
						2.9E-003	i			7664-38-2	Phosphoric acid					1.0E+001	nc				
		2.0E-005	i					0		7723-14-0	Phosphorus (white)	1.8E+000	nc	4.1E+001	nc			7.3E-001	nc		
		1.0E+000	h			1.0E+000	r	0	0.10	100-21-0	p-Phthalic acid	8.1E+004	nc	1.0E+005	max	3.7E+003	nc	3.6E+004	nc		
		2.0E+000	i			3.4E-002	h	0	0.10	85-44-9	Phthalic anhydride	1.0E+005	max	1.0E+005	max	1.2E+002	nc	7.3E+004	nc		
		7.0E-002	i			7.0E-002	r	0	0.10	1918-02-1	Picloram	4.3E+003	nc	6.2E+004	nc	2.6E+002	nc	2.6E+003	nc		
		1.0E-002	i			1.0E-002	r	0	0.10	23505-41-1	Pirimiphos-methyl	6.1E+002	nc	8.8E+003	nc	3.7E+001	nc	3.6E+002	nc		
8.9E+000	h	7.0E-005	h	8.9E+000	r	7.0E-005	r	0	0.10		Polybrominated biphenyls	5.6E-002	ca**	2.8E-001	ca*	7.6E-004	ca*	7.6E-003	ca*		
2.0E+000	i			2.0E+000	i			0	0.14	1336-36-3	Polychlorinated biphenyls (PCBs)	2.2E-001	ca	1.0E+000	ca	3.4E-003	ca	3.4E-002	ca		
7.0E-002	i	7.0E-005	i	7.0E-002	i	7.0E-005	r	0	0.14	12674-11-2	Aroclor 1016	3.9E+000	nc	2.9E+001	ca**	9.6E-002	ca**	9.6E-001	ca**		
2.0E+000	i			2.0E+000	i			0	0.14	11104-28-2	Aroclor 1221	2.2E-001	ca	1.0E+000	ca	3.4E-003	ca	3.4E-002	ca		
2.0E+000	i			2.0E+000	i			0	0.14	11141-16-5	Aroclor 1232	2.2E-001	ca	1.0E+000	ca	3.4E-003	ca	3.4E-002	ca		
2.0E+000	i			2.0E+000	i			0	0.14	53469-21-9	Aroclor 1242	2.2E-001	ca	1.0E+000	ca	3.4E-003	ca	3.4E-002	ca		
2.0E+000	i			2.0E+000	i			0	0.14	12672-29-6	Aroclor 1248	2.2E-001	ca	1.0E+000	ca	3.4E-003	ca	3.4E-002	ca		
2.0E+000	i	2.0E-005	i	2.0E+000	i	2.0E-005	r	0	0.14	11097-69-1	Aroclor 1254	2.2E-001	ca**	1.0E+000	ca*	3.4E-003	ca*	3.4E-002	ca*		
2.0E+000	i			2.0E+000	i			0	0.14	11096-82-5	Aroclor 1260	2.2E-001	ca	1.0E+000	ca	3.4E-003	ca	3.4E-002	ca		
									0.13		Polynuclear aromatic hydrocarbons (PAHs)										
		6.0E-002	i			6.0E-002	r	1		83-32-9	Acenaphthene	3.7E+003	nc	3.8E+004	nc	2.2E+002	nc	3.7E+002	nc	5.7E+002	2.9E+001
		3.0E-001	i			3.0E-001	r	1		120-12-7	Anthracene	2.2E+004	nc	1.0E+005	max	1.1E+003	nc	1.8E+003	nc	1.2E+004	5.9E+002
7.3E-001	n			3.1E-001	n			0	0.13	56-55-3	Benz[a]anthracene	6.2E-001	ca	2.9E+000	ca	2.2E-002	ca	9.2E-002	ca	2.0E+000	8.0E-002
7.3E-001	n			3.1E-001	n			0	0.13	205-99-2	Benzo[b]fluoranthene	6.2E-001	ca	2.9E+000	ca	2.2E-002	ca	9.2E-002	ca	5.0E+000	2.0E-001
7.3E-002	n			3.1E-002	n			0	0.13	207-08-9	Benzo[k]fluoranthene	6.2E+000	ca	2.9E+001	ca	2.2E-001	ca	9.2E-001	ca	4.9E+001	2.0E+000
											"CAL-Modified PRG" (PEA, 1994)	6.1E-001									
7.3E+000	i			3.1E+000	n			0	0.13	50-32-8	Benzo[a]pyrene	6.2E-002	ca	2.9E-001	ca	2.2E-003	ca	9.2E-003	ca	8.0E+000	4.0E-001
											"CAL-Modified PRG" (PEA, 1994)							1.5E-003			

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FOR PLANNING PURPOSES

TOXICITY INFORMATION										CONTAMINANT		PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
																				Migration to Ground Water	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		V/O/C	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		2.0E-004	i			2.0E-004	r	0	0.10	60-51-5	Dimethoate	1.2E+001	nc	1.8E+002	nc	7.3E-001	nc	7.3E+000	nc		
1.4E-002	h			1.4E-002	r			0	0.10	119-90-4	3,3'-Dimethoxybenzidine	3.5E+001	ca	1.8E+002	ca	4.8E-001	ca	4.8E+000	ca		
		5.7E-006	r			5.7E-006	x	1		124-40-3	Dimethylamine	8.7E-002	nc	2.5E-001	nc	2.1E-002	nc	3.5E-002	nc		
		2.0E-003	i			2.0E-003	r	0	0.10	121-69-7	N-N-Dimethylaniline	1.2E+002	nc	1.8E+003	nc	7.3E+000	nc	7.3E+001	nc		
7.5E-001	h			7.5E-001	r			0	0.10	95-68-1	2,4-Dimethylaniline	6.5E-001	ca	3.3E+000	ca	9.0E-003	ca	9.0E-002	ca		
5.8E-001	h			5.8E-001	r			0	0.10	21436-96-4	2,4-Dimethylaniline hydrochloride	8.4E-001	ca	4.3E+000	ca	1.2E-002	ca	1.2E-001	ca		
9.2E+000	h			9.2E+000	r			0	0.10	119-93-7	3,3'-Dimethylbenzidine	5.3E-002	ca	2.7E-001	ca	7.3E-004	ca	7.3E-003	ca		
2.5E+000	x			3.5E+000	x			0	0.10	57-14-7	1,1-Dimethylhydrazine	1.9E-001	ca	9.5E-001	ca	1.9E-003	ca	2.6E-002	ca		
3.7E+001	x			3.7E+001	x			0	0.10	540-73-8	1,2-Dimethylhydrazine	1.3E-002	ca	6.7E-002	ca	1.8E-004	ca	1.8E-003	ca		
		1.0E-001	h			8.6E-003	i	0	0.10	68-12-2	N,N-Dimethylformamide	6.1E+003	nc	8.8E+004	nc	3.1E+001	nc	3.6E+003	nc		
		1.0E-003	n			1.0E-003	r	0	0.10	122-09-8	Dimethylphenethylamine	6.1E+001	nc	8.8E+002	nc	3.7E+000	nc	3.6E+001	nc		
		2.0E-002	i			2.0E-002	r	0	0.10	105-67-9	2,4-Dimethylphenol	1.2E+003	nc	1.8E+004	nc	7.3E+001	nc	7.3E+002	nc	9.0E+000	4.0E-001
		6.0E-004	i			6.0E-004	r	0	0.10	576-26-1	2,6-Dimethylphenol	3.7E+001	nc	5.3E+002	nc	2.2E+000	nc	2.2E+001	nc		
		1.0E-003	i			1.0E-003	r	0	0.10	95-65-8	3,4-Dimethylphenol	6.1E+001	nc	8.8E+002	nc	3.7E+000	nc	3.6E+001	nc		
		1.0E+001	h			1.0E+001	r	0	0.10	131-11-3	Dimethyl phthalate	1.0E+005	max	1.0E+005	max	3.7E+004	nc	3.6E+005	nc		
		1.0E-001	i			1.0E-001	r	0	0.10	120-61-6	Dimethyl terephthalate	6.1E+003	nc	8.8E+004	nc	3.7E+002	nc	3.6E+003	nc		
		2.0E-003	i			2.0E-003	r	0	0.10	131-89-5	4,6-Dinitro-o-cyclohexyl phenol	1.2E+002	nc	1.8E+003	nc	7.3E+000	nc	7.3E+001	nc		
		4.0E-004	h			4.0E-004	r	0	0.10	528-29-0	1,2-Dinitrobenzene	2.4E+001	nc	3.5E+002	nc	1.5E+000	nc	1.5E+001	nc		
		1.0E-004	i			1.0E-004	r	0	0.10	99-65-0	1,3-Dinitrobenzene	6.1E+000	nc	8.8E+001	nc	3.7E-001	nc	3.6E+000	nc		
		4.0E-004	h			4.0E-004	r	0	0.10	100-25-4	1,4-Dinitrobenzene	2.4E+001	nc	3.5E+002	nc	1.5E+000	nc	1.5E+001	nc		
		2.0E-003	i			2.0E-003	r	0	0.10	51-28-5	2,4-Dinitrophenol	1.2E+002	nc	1.8E+003	nc	7.3E+000	nc	7.3E+001	nc	3.0E-001	1.0E-002
6.8E-001	i			6.8E-001	r			0	0.10	25321-14-6	Dinitrotoluene mixture	7.2E-001	ca	3.6E+000	ca	9.9E-003	ca	9.9E-002	ca	8.0E-004	4.0E-005
		2.0E-003	i			2.0E-003	r	0	0.10	121-14-2	2,4-Dinitrotoluene (also see Dinitrotoluene mixture)	1.2E+002	nc	1.8E+003	nc	7.3E+000	nc	7.3E+001	nc	8.0E-004	4.0E-005
		1.0E-003	h			1.0E-003	r	0	0.10	606-20-2	2,6-Dinitrotoluene (also see Dinitrotoluene mixture)	6.1E+001	nc	8.8E+002	nc	3.7E+000	nc	3.6E+001	nc	7.0E-004	3.0E-005
		1.0E-003	i			1.0E-003	r	0	0.10	88-85-7	Dinoseb	6.1E+001	nc	8.8E+002	nc	3.7E+000	nc	3.6E+001	nc		
		2.0E-002	h			2.0E-002	r	0	0.10	117-84-0	di-n-Octyl phthalate	1.2E+003	nc	1.0E+004	sat	7.3E+001	nc	7.3E+002	nc	1.0E+004	1.0E+004
1.1E-002	i			1.1E-002	r			0	0.10	123-91-1	1,4-Dioxane	4.4E+001	ca	2.2E+002	ca	6.1E-001	ca	6.1E+000	ca		
1.5E+005	h			1.5E+005	h			0	0.03	1746-01-6	Dioxin (2,3,7,8-TCDD)	3.9E-006	ca	2.7E-005	ca	4.5E-008	ca	4.5E-007	ca		
		3.0E-002	i			3.0E-002	r	0	0.10	957-51-7	Diphenamid	1.8E+003	nc	2.6E+004	nc	1.1E+002	nc	1.1E+003	nc		
		7.5E-002	i			2.5E-002	r	0	0.10	122-39-4	Diphenylamine	1.5E+003	nc	2.2E+004	nc	9.1E+001	nc	9.1E+002	nc		
8.0E-001	i			7.7E-001	i			0	0.10	122-66-7	1,2-Diphenylhydrazine	6.1E-001	ca	3.1E+000	ca	8.7E-003	ca	8.4E-002	ca		
		9.0E-003	n			9.0E-003	r	0	0.10	127-63-9	Diphenyl sulfone	5.5E+002	nc	7.9E+003	nc	3.3E+001	nc	3.3E+002	nc		
		2.2E-003	i			2.2E-003	r	0	0.10	85-00-7	Diquat	1.3E+002	nc	1.9E+003	nc	8.0E+000	nc	8.0E+001	nc		
8.6E+000	h			8.6E+000	r			0	0.10	1937-37-7	Direct black 38	5.7E-002	ca	2.9E-001	ca	7.8E-004	ca	7.8E-003	ca		
8.1E+000	h			8.1E+000	r			0	0.10	2602-46-2	Direct blue 6	6.0E-002	ca	3.0E-001	ca	8.3E-004	ca	8.3E-003	ca		
9.3E+000	h			9.3E+000	r			0	0.10	16071-86-6	Direct brown 95	5.2E-002	ca	2.7E-001	ca	7.2E-004	ca	7.2E-003	ca		
		4.0E-005	i			4.0E-005	r	0	0.10	298-04-4	Disulfoton	2.4E+000	nc	3.5E+001	nc	1.5E-001	nc	1.5E+000	nc		
		1.0E-002	i			1.0E-002	r	0	0.10	505-29-3	1,4-Dithiane	6.1E+002	nc	8.8E+003	nc	3.7E+001	nc	3.6E+002	nc		
		2.0E-003	i			2.0E-003	r	0	0.10	330-54-1	Diuron	1.2E+002	nc	1.8E+003	nc	7.3E+000	nc	7.3E+001	nc		
		4.0E-003	i			4.0E-003	r	0	0.10	2439-10-3	Dodine	2.4E+002	nc	3.5E+003	nc	1.5E+001	nc	1.5E+002	nc		
		6.0E-003	i			6.0E-003	r	0	0.10	115-29-7	Endosulfan	3.7E+002	nc	5.3E+003	nc	2.2E+001	nc	2.2E+002	nc	1.8E+001	9.0E-001
		2.0E-002	i			2.0E-002	r	0	0.10	145-73-3	Endothall	1.2E+003	nc	1.8E+004	nc	7.3E+001	nc	7.3E+002	nc		
		3.0E-004	i			3.0E-004	r	0	0.10	72-20-8	Endrin	1.8E+001	nc	2.6E+002	nc	1.1E+000	nc	1.1E+001	nc	1.0E+000	5.0E-002
9.9E-003	i	2.0E-003	h	4.2E-003	i	2.9E-004	i	1		106-89-8	Epichlorohydrin	7.6E+000	nc	2.6E+001	nc	1.0E+000	nc	2.0E+000	nc		
		5.7E-003	r			5.7E-003	i	0	0.10	106-88-7	1,2-Epoxybutane	3.5E+002	nc	5.0E+003	nc	2.1E+001	nc	2.1E+002	nc		
		2.5E-002	i			2.5E-002	r	0	0.10	759-94-4	EPTC (S-Ethyl dipropylthiocarbamate)	1.5E+003	nc	2.2E+004	nc	9.1E+001	nc	9.1E+002	nc		
		5.0E-003	i			5.0E-003	r	0	0.10	16672-87-0	Ethephon (2-chloroethyl phosphonic acid)	3.1E+002	nc	4.4E+003	nc	1.8E+001	nc	1.8E+002	nc		
		5.0E-004	i			5.0E-004	r	0	0.10	563-12-2	Ethion	3.1E+001	nc	4.4E+002	nc	1.8E+000	nc	1.8E+001	nc		
		4.0E-001	h			5.7E-002	i	0	0.10	110-80-5	2-Ethoxyethanol	2.4E+004	nc	1.0E+005	max	2.1E+002	nc	1.5E+004	nc		
		3.0E-001	h			3.0E-001	r	0	0.10	111-15-9	2-Ethoxyethanol acetate	1.8E+004	nc	1.0E+005	max	1.1E+003	nc	1.1E+004	nc		
		9.0E-001	i			9.0E-001	r	1		141-78-6	Ethyl acetate	1.9E+004	nc	3.7E+004	sat	3.3E+003	nc	5.5E+003	nc		
4.8E-002	h			4.8E-002	r			1		140-88-5	Ethyl acrylate	2.1E-001	ca	4.5E-001	ca	1.4E-001	ca	2.3E-001	ca		
		1.0E-001	i			2.9E-001	i	1		100-41-4	Ethylbenzene	2.3E+002	sat	2.3E+002	sat	1.1E+003	nc	1.3E+003	nc	1.3E+001	7.0E-001
2.9E-003	n	4.0E-001	n	2.9E-003	r	2.9E+000	i	1		75-00-3	Ethyl chloride	3.0E+000	ca	6.5E+000	ca	2.3E+000	ca	4.6E+000	ca		

Key : i=IRIS n=NCEA h=HEAST x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION										CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
																			Migration to Groundwater	
RfD (mg/kg-d)		RfDo (mg/kg-d)		SF (mg/kg-d)-1		SFo (mg/kg-d)-1		Vol	Henry's Law Constant (atm-m3/mol)	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m3)		Tap Water (ug/L)		DAF=1 (mg/kg)	DAF=20 (mg/kg)
		3.0E-001	h			3.0E-001	r	0	0.10	109-78-4	Ethylene cyanohydrin	1.8E+004	nc	1.0E+005	max	1.1E+003	nc	1.1E+004	nc		
		2.0E-002	h			2.0E-002	r	0	0.10	107-15-3	Ethylene diamine	1.2E+003	nc	1.8E+004	nc	7.3E+001	nc	7.3E+002	nc		
		2.0E-000	i			2.0E+000	r	0	0.10	107-21-1	Ethylene glycol	1.0E+005	max	1.0E+005	max	7.3E+003	nc	7.3E+004	nc		
		5.7E-003	r			5.7E-003	h	0	0.10	111-76-2	Ethylene glycol, monobutyl ether	3.5E+002	nc	5.0E+003	nc	2.1E+001	nc	2.1E+002	nc		
1.0E+000	h			3.5E-001	h			1		75-21-8	Ethylene oxide	1.4E-001	ca	3.6E-001	ca	1.9E-002	ca	2.4E-002	ca		
1.1E-001	h	8.0E-005	i	1.1E-001	r	8.0E-005	r	0	0.10	96-45-7	Ethylene thiourea (ETU)	4.4E+000	ca**	2.2E+001	ca**	6.1E-002	ca**	6.1E-001	ca**		
		2.0E-001	i			2.0E-001	r	1		60-29-7	Ethyl ether	1.8E+003	sat	1.8E+003	sat	7.3E+002	nc	1.2E+003	nc		
		9.0E-002	h			9.0E-002	r	1		97-63-2	Ethyl methacrylate	1.4E+002	sat	1.4E+002	sat	3.3E+002	nc	5.5E+002	nc		
		1.0E-005	i			1.0E-005	r	0	0.10	2104-64-5	Ethyl p-nitrophenyl phenylphosphorothioate	6.1E-001	nc	8.8E+000	nc	3.7E-002	nc	3.6E-001	nc		
		3.0E+000	i			3.0E+000	r	0	0.10	84-72-0	Ethylphthalyl ethyl glycolate	1.0E+005	max	1.0E+005	max	1.1E+004	nc	1.1E+005	nc		
		8.0E-003	i			8.0E-003	r	0	0.10	101200-48-0	Express	4.9E+002	nc	7.0E+003	nc	2.9E+001	nc	2.9E+002	nc		
		2.5E-004	i			2.5E-004	r	0	0.10	22224-92-6	Fenamiphos	1.5E+001	nc	2.2E+002	nc	9.1E-001	nc	9.1E+000	nc		
		1.3E-002	i			1.3E-002	r	0	0.10	2164-17-2	Fluometuron	7.9E+002	nc	1.1E+004	nc	4.7E+001	nc	4.7E+002	nc		
		6.0E-002	i					0	0.10	16984-48-8	Flouride	3.7E+003	nc	5.3E+004	nc			2.2E+003	nc		
		8.0E-002	i			8.0E-002	r	0	0.10	59756-60-4	Fluoridone	4.9E+003	nc	7.0E+004	nc	2.9E+002	nc	2.9E+003	nc		
		2.0E-002	i			2.0E-002	r	0	0.10	56425-91-3	Flurprimidol	1.2E+003	nc	1.8E+004	nc	7.3E+001	nc	7.3E+002	nc		
		6.0E-002	i			6.0E-002	r	0	0.10	66332-96-5	Flutolanil	3.7E+003	nc	5.3E+004	nc	2.2E+002	nc	2.2E+003	nc		
		1.0E-002	i			1.0E-002	r	0	0.10	69409-94-5	Fluvalinate	6.1E+002	nc	8.8E+003	nc	3.7E+001	nc	3.6E+002	nc		
3.5E-003	i	1.0E-001	i	3.5E-003	r	1.0E-001	r	0	0.10	133-07-3	Folpet	1.4E+002	ca*	7.0E+002	ca	1.9E+000	ca	1.9E+001	ca		
1.9E-001	i			1.9E-001	r			0	0.10	72178-02-0	Fomesafen	2.6E+000	ca	1.3E+001	ca	3.5E-002	ca	3.5E-001	ca		
		2.0E-003	i			2.0E-003	r	0	0.10	944-22-9	Fonofos	1.2E+002	nc	1.8E+003	nc	7.3E+000	nc	7.3E+001	nc		
		1.5E-001	i	4.6E-002	i			0	0.10	50-00-0	Formaldehyde	9.2E+003	nc	1.0E+005	nc	1.5E-001	ca	5.5E+003	nc		
		2.0E+000	h			2.0E+000	r	0	0.10	64-18-6	Formic Acid	1.0E+005	max	1.0E+005	max	7.3E+003	nc	7.3E+004	nc		
		3.0E+000	i			3.0E+000	r	0	0.10	39148-24-8	Fosetyl-al	1.0E+005	max	1.0E+005	max	1.1E+004	nc	1.1E+005	nc		
		1.0E-003	i			1.0E-003	r	1		110-00-9	Furan	2.5E+000	nc	8.5E+000	nc	3.7E+000	nc	6.1E+000	nc		
3.8E+000	h			3.8E+000	r			0	0.10	67-45-8	Furazolidone	1.3E-001	ca	6.5E-001	ca	1.8E-003	ca	1.8E-002	ca		
		3.0E-003	i			1.4E-002	h	0	0.10	98-01-1	Furfural	1.8E+002	nc	2.6E+003	nc	5.2E+001	nc	1.1E+002	nc		
5.0E+001	h			5.0E+001	r			0	0.10	531-82-8	Furium	9.7E-003	ca	4.9E-002	ca	1.3E-004	ca	1.3E-003	ca		
3.0E-002	i			3.0E-002	r			0	0.10	60568-05-0	Furmecyclox	1.6E+001	ca	8.2E+001	ca	2.2E-001	ca	2.2E+000	ca		
		4.0E-004	i			4.0E-004	r	0	0.10	77182-82-2	Glufosinate-ammonium	2.4E+001	nc	3.5E+002	nc	1.5E+000	nc	1.5E+001	nc		
		4.0E-004	i			2.8E-004	h	0	0.10	765-34-4	Glycidaldehyde	2.4E+001	nc	3.5E+002	nc	1.0E+000	nc	1.5E+001	nc		
		1.0E-001	i			1.0E-001	r	0	0.10	1071-83-6	Glyphosate	6.1E+003	nc	8.8E+004	nc	3.7E+002	nc	3.6E+003	nc		
		5.0E-005	i			5.0E-005	r	0	0.10	95806-40-2	Haloxyfop-methyl	3.1E+000	nc	4.4E+001	nc	1.8E-001	nc	1.8E+000	nc		
		1.3E-002	i			1.3E-002	r	0	0.10	79277-27-3	Harmony	7.9E+002	nc	1.1E+004	nc	4.7E+001	nc	4.7E+002	nc		
4.5E+000	i	5.0E-004	i	4.6E+000	i	5.0E-004	r	0	0.10	76-44-8	Heptachlor	1.1E-001	ca	5.5E-001	ca	1.5E-003	ca	1.5E-002	ca	2.3E+001	1.0E+000
9.1E+000	i	1.3E-005	i	9.1E+000	i	1.3E-005	r	0	0.10	1024-57-3	Heptachlor epoxide	5.3E-002	ca*	2.7E-001	ca*	7.4E-004	ca*	7.4E-003	ca*	7.0E-001	3.0E-002
		2.0E-003	i			2.0E-003	r	0	0.10	87-82-1	Hexabromobenzene	1.2E+002	nc	1.8E+003	nc	7.3E+000	nc	7.3E+001	nc		
1.6E+000	i	8.0E-004	i	1.6E+000	i	8.0E-004	r	0	0.10	118-74-1	Hexachlorobenzene	3.0E-001	ca	1.5E+000	ca	4.2E-003	ca	4.2E-002	ca	2.0E+000	1.0E-001
7.8E-002	i	2.0E-004	h	7.8E-002	i	2.0E-004	r	0	0.10	87-68-3	Hexachlorobutadiene	6.2E+000	ca**	3.2E+001	ca**	8.6E-002	ca**	8.6E-001	ca**	2.0E+000	1.0E-001
6.3E+000	i			6.3E+000	i			0	0.04	319-84-6	HCH (alpha)	9.0E-002	ca	5.9E-001	ca	1.1E-003	ca	1.1E-002	ca	5.0E-004	3.0E-005
1.5E+000	i			1.5E+000	i			0	0.04	319-85-7	HCH (beta)	3.2E-001	ca	2.1E+000	ca	3.7E-003	ca	3.7E-002	ca	3.0E-003	1.0E-004
1.3E+000	h	3.0E-004	i	1.3E+000	r	3.0E-004	r	0	0.04	58-89-9	HCH (gamma) Lindane	4.4E-001	ca*	2.9E+000	ca	5.2E-003	ca	5.2E-002	ca	9.0E-003	5.0E-004
1.8E+000	i			1.8E+000	i			0	0.04	608-73-1	HCH-technical	3.2E-001	ca	2.1E+000	ca	3.8E-003	ca	3.7E-002	ca	3.0E-003	1.0E-004
		7.0E-003	i			2.0E-005	h	0	0.10	77-47-4	Hexachlorocyclopentadiene	4.2E+002	nc	5.9E+003	nc	7.3E-002	nc	2.6E+002	nc	4.0E+002	2.0E+001
6.2E+003	i			4.6E+003	i			0	0.10	19408-74-3	Hexachlorodibenzo-p-dioxin mixture (HxCDD)	7.8E-005	ca	4.0E-004	ca	1.5E-006	ca	1.1E-005	ca		
1.4E-002	i	1.0E-003	i	1.4E-002	i	1.0E-003	r	0	0.10	67-72-1	Hexachloroethane	3.5E+001	ca**	1.8E+002	ca**	4.8E-001	ca**	4.8E+000	ca**	5.0E-001	2.0E-002
		3.0E-004	i			3.0E-004	r	0	0.10	70-30-4	Hexachlorophene	1.8E+001	nc	2.6E+002	nc	1.1E+000	nc	1.1E+001	nc		
1.1E-001	i	3.0E-003	i	1.1E-001	r	3.0E-003	r	0	0.10	121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	4.4E+000	ca*	2.2E+001	ca	6.1E-002	ca	6.1E-001	ca		
		2.8E-006	r			2.8E-006	i	0	0.10	822-06-0	1,6-Hexamethylene diisocyanate	1.7E-001	nc	2.5E+000	nc	1.0E-002	nc	1.0E-001	nc		
		6.0E-002	h			5.7E-002	i	1		110-54-3	n-Hexane	1.1E+002	sat	1.1E+002	sat	2.1E+002	nc	3.5E+002	nc		
		3.3E-002	i			3.3E-002	r	0	0.10	51235-04-2	Hexazinone	2.0E+003	nc	2.9E+004	nc	1.2E+002	nc	1.2E+003	nc		
3.0E+000	i			1.7E+001	i			0	0.10	302-01-2	Hydrazine, hydrazine sulfate	1.6E-001	ca	8.2E-001	ca	3.9E-004	ca	2.2E-002	ca		
						5.7E-003	i			7647-01-0	Hydrogen chloride					2.1E+001	nc				
		3.0E-003	i			2.9E-004	i			7783-06-4	Hydrogen sulfide					1.0E+000	nc	1.1E+002	nc		

Key: i=IRIS n=NCEA h=HEAST w=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION									CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
																		Migration to Groundwater	
SFo		RfDo		SFi		RfDi		CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m3)		Tap Water (ug/L)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
5.1(mg/kg-d)		5 (mg/kg-d)		20 (mg/kg-d)		5 (mg/kg-d)													
		2.0E-001	i			2.0E-001	r	0	0.10	108-91-8	Cyclohexylamine	1.2E+004	nc	1.0E+005	max	7.3E+002	nc	7.3E+003	nc		
		5.0E-003	i			5.0E-003	r	0	0.10	68085-85-8	Cyhalothrin/Karate	3.1E+002	nc	4.4E+003	nc	1.8E+001	nc	1.8E+002	nc		
		1.0E-002	i			1.0E-002	r	0	0.10	52315-07-8	Cypermethrin	6.1E+002	nc	8.8E+003	nc	3.7E+001	nc	3.6E+002	nc		
		7.5E-003	i			7.5E-003	r	0	0.10	66215-27-8	Cyromazine	4.6E+002	nc	6.6E+003	nc	2.7E+001	nc	2.7E+002	nc		
		1.0E-002	i			1.0E-002	r	0	0.10	1861-32-1	Dacthal	6.1E+002	nc	8.8E+003	nc	3.7E+001	nc	3.6E+002	nc		
		3.0E-002	i			3.0E-002	r	0	0.10	75-99-0	Dalapon	1.8E+003	nc	2.6E+004	nc	1.1E+002	nc	1.1E+003	nc		
		2.5E-002	i			2.5E-002	r	0	0.10	39515-41-8	Danitol	1.5E+003	nc	2.2E+004	nc	9.1E+001	nc	9.1E+002	nc		
2.4E-001	i			2.4E-001	r			0	0.03	72-54-8	DDD	2.4E+000	ca	1.7E+001	ca	2.8E-002	ca	2.8E-001	ca	1.6E+001	8.0E-001
3.4E-001	i			3.4E-001	r			0	0.03	72-55-9	DDE	1.7E+000	ca	1.2E+001	ca	2.0E-002	ca	2.0E-001	ca	5.4E+001	3.0E+000
3.4E-001	i	5.0E-004	i	3.4E-001	i	5.0E-004	r	0	0.03	50-29-3	DDT	1.7E+000	ca*	1.2E+001	ca*	2.0E-002	ca*	2.0E-001	ca*	3.2E+001	2.0E+000
		1.0E-002	i			1.0E-002	r	0	0.10	1163-19-5	Decabromodiphenyl ether	6.1E+002	nc	8.8E+003	nc	3.7E+001	nc	3.6E+002	nc		
		4.0E-005	i			4.0E-005	r	0	0.10	8065-48-3	Demeton	2.4E+000	nc	3.5E+001	nc	1.5E-001	nc	1.5E+000	nc		
8.1E-002	h			8.1E-002	r			0	0.10	2303-16-4	Diallate	8.0E+000	ca	4.0E+001	ca	1.1E-001	ca	1.1E+000	ca		
		9.0E-004	h			9.0E-004	r	0	0.10	333-41-5	Diazinon	5.5E+001	nc	7.9E+002	nc	3.3E+000	nc	3.3E+001	nc		
		4.0E-003	a			4.0E-003	r	1		132-64-9	Dibenzofuran	2.9E+002	nc	5.1E+003	nc	1.5E+001	nc	2.4E+001	nc		
		1.0E-002	i			1.0E-002	r	0	0.10	106-37-6	1,4-Dibromobenzene	6.1E+002	nc	8.8E+003	nc	3.7E+001	nc	3.6E+002	nc		
8.4E-002	i	2.0E-002	i	8.4E-002	r	2.0E-002	r	1		124-48-1	Dibromochloromethane	1.1E+000	ca	2.7E+000	ca	8.0E-002	ca	1.3E-001	ca	4.0E-001	2.0E-002
1.4E+000	h	5.7E-005	r	2.4E-003	h	5.7E-005	i	1		96-12-8	1,2-Dibromo-3-chloropropane	4.5E-001	ca**	4.0E+000	ca**	2.1E-001	nc	4.8E-002	ca**		
											"CAL-Modified PRG" (PEA, 1994)	6.0E-002				9.6E-004		4.7E-003			
8.5E+001	i	5.7E-005	r	7.7E-001	i	5.7E-005	h	1		106-93-4	1,2-Dibromoethane	6.9E-003	ca	4.8E-002	ca*	6.7E-003	ca*	7.6E-004	ca		
		1.0E-001	i			1.0E-001	r	0	0.10	84-74-2	Dibutyl phthalate	6.1E+003	nc	8.8E+004	nc	3.7E+002	nc	3.6E+003	nc	2.3E+003	2.7E+002
		3.0E-002	i			3.0E-002	r	0	0.10	1918-00-9	Dicamba	1.8E+003	nc	2.6E+004	nc	1.1E+002	nc	1.1E+003	nc		
		9.0E-002	i			5.7E-002	h	1		95-50-1	1,2-Dichlorobenzene	3.7E+002	sat	3.7E+002	sat	2.1E+002	nc	3.7E+002	nc	1.7E+001	9.0E-001
		9.0E-004	n			9.0E-004	r	1		541-73-1	1,3-Dichlorobenzene	1.3E+001	nc	5.2E+001	nc	3.3E+000	nc	5.5E+000	nc		
2.4E-002	h	9.0E-002	n	2.2E-002	n	3.0E-002	i	1		106-46-7	1,4-Dichlorobenzene	3.4E+000	ca	8.1E+000	ca	3.1E-001	ca	5.0E-001	ca	2.0E+000	1.0E-001
4.5E-001	i			4.5E-001	r			0	0.10	91-94-1	3,3-Dichlorobenzidine	1.1E+000	ca	5.5E+000	ca	1.5E-002	ca	1.5E-001	ca	7.0E-003	3.0E-004
8.3E+000	i			9.3E+000	h			1		764-41-0	1,4-Dichloro-2-butene	7.9E-003	ca	1.8E-002	ca	7.2E-004	ca	1.2E-003	ca		
		2.0E-001	i			5.7E-002	h	1		75-71-8	Dichlorodifluoromethane	9.4E+001	nc	3.1E+002	nc	2.1E+002	nc	3.9E+002	nc		
		1.0E-001	h			1.4E-001	h	1		75-34-3	1,1-Dichloroethane	5.9E+002	nc	2.1E+003	nc	5.2E+002	nc	8.1E+002	nc	2.3E+001	1.0E+000
9.1E-002	i	3.0E-002	h	9.1E-002	i	1.4E-003	n	1		107-06-2	1,2-Dichloroethane (EDC)	3.5E-001	ca*	7.6E-001	ca*	7.4E-002	ca*	1.2E-001	ca*	2.0E-002	1.0E-003
6.0E-001	i	9.0E-003	i	1.8E-001	i	9.0E-003	r	1		75-35-4	1,1-Dichloroethylene	5.4E-002	ca	1.2E-001	ca	3.8E-002	ca	4.6E-002	ca	6.0E-002	3.0E-003
		1.0E-002	h			1.0E-002	r	1		156-59-2	1,2-Dichloroethylene (cis)	4.3E+001	nc	1.5E+002	nc	3.7E+001	nc	6.1E+001	nc	4.0E-001	2.0E-002
		2.0E-002	i			2.0E-002	r	1		156-60-5	1,2-Dichloroethylene (trans)	6.3E+001	nc	2.1E+002	nc	7.3E+001	nc	1.2E+002	nc	7.0E-001	3.0E-002
		3.0E-003	i			3.0E-003	r	0	0.10	120-83-2	2,4-Dichlorophenol	1.8E+002	nc	2.6E+003	nc	1.1E+001	nc	1.1E+002	nc	1.0E+000	5.0E-002
		8.0E-003	i			8.0E-003	r	0	0.10	94-82-6	4-(2,4-Dichlorophenoxy)butyric Acid (2,4-DB)	4.9E+002	nc	7.0E+003	nc	2.9E+001	nc	2.9E+002	nc		
		1.0E-002	i			1.0E-002	r	0	0.05	94-75-7	2,4-Dichlorophenoxyacetic Acid (2,4-D)	6.9E+002	nc	1.2E+004	nc	3.7E+001	nc	3.6E+002	nc		
6.8E-002	h	1.1E-003	r	6.8E-002	r	1.1E-003	r	1		78-87-5	1,2-Dichloropropane	3.5E-001	ca*	7.7E-001	ca*	9.9E-002	ca*	1.6E-001	ca*	3.0E-002	1.0E-003
1.8E-001	h	3.0E-004	i	1.3E-001	h	5.7E-003	i	1		542-75-6	1,3-Dichloropropene	8.2E-002	ca	1.8E-001	ca	5.2E-002	ca	8.1E-002	ca	4.0E-003	2.0E-004
		3.0E-003	i			3.0E-003	r	0	0.10	616-23-9	2,3-Dichloropropanol	1.8E+002	nc	2.6E+003	nc	1.1E+001	nc	1.1E+002	nc		
2.9E-001	i	5.0E-004	i	2.9E-001	r	1.4E-004	i	0	0.10	62-73-7	Dichlorvos	1.7E+000	ca*	8.5E+000	ca*	2.3E-002	ca*	2.3E-001	ca*		
4.4E-001	i			4.4E-001	r			0	0.10	115-32-2	Dicofol	1.1E+000	ca	5.6E+000	ca	1.5E-002	ca	1.5E-001	ca		
		3.0E-002	h			5.7E-005	h	1		77-73-6	Dicyclopentadiene	5.4E-001	nc	1.8E+000	nc	2.1E-001	nc	4.2E-001	nc		
1.6E+001	i	5.0E-005	i	1.6E+001	i	5.0E-005	r	0	0.10	60-57-1	Dieldrin	3.0E-002	ca	1.5E-001	ca	4.2E-004	ca	4.2E-003	ca	4.0E-003	2.0E-004
		5.7E-003	r			5.7E-003	h	0	0.10	112-34-5	Diethylene glycol, monobutyl ether	3.5E+002	nc	5.0E+003	nc	2.1E+001	nc	2.1E+002	nc		
		2.0E-000	h			2.0E+000	r	0	0.10	111-90-0	Diethylene glycol, monoethyl ether	1.0E+005	max	1.0E+005	max	7.3E+003	nc	7.3E+004	nc		
		1.1E-002	h			1.1E-002	r	0	0.10	617-84-5	Diethylformamide	6.7E+002	nc	9.7E+003	nc	4.0E+001	nc	4.0E+002	nc		
1.2E-003	i	8.0E-001	i	1.2E-003	r	8.0E-001	r	0	0.10	103-23-1	Di(2-ethylhexyl)adipate	4.1E+002	ca	2.1E+003	ca	5.6E+000	ca	5.6E+001	ca		
		8.0E-001	i			8.0E-001	r	0	0.10	84-66-2	Diethyl phthalate	4.9E+004	nc	1.0E+005	max	2.9E+003	nc	2.9E+004	nc		
4.7E-003	h			4.7E-003	r			0	0.10	56-53-1	Diethylstilbestrol	1.0E-004	ca	5.2E-004	ca	1.4E-006	ca	1.4E-005	ca		
		8.0E-002	i			8.0E-002	r	0	0.10	43222-48-6	Difenzoquat (Avenge)	4.9E+003	nc	7.0E+004	nc	2.9E+002	nc	2.9E+003	nc		
		2.0E-002	i			2.0E-002	r	0	0.10	35367-38-5	Diflubenzuron	1.2E+003	nc	1.8E+004	nc	7.3E+001	nc	7.3E+002	nc		
		1.1E+001	r			1.1E+001	i	1		75-37-6	1,1-Difluoroethane					4.2E+004	nc	6.9E+004	nc		
		8.0E-002	i			8.0E-002	r	0	0.10	1445-75-6	Diisopropyl methylphosphonate	4.9E+003	nc	7.0E+004	nc	2.9E+002	nc	2.9E+003	nc		
		2.0E-002	i			2.0E-002	r	0	0.10	55290-64-7	Dimethipin	1.2E+003	nc	1.8E+004	nc	7.3E+001	nc	7.3E+002	nc		

Key : i=IRIS n=NCEA h=HEAST x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION										CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
SFO (1/(mg/kg-d))		RfDO (mg/kg-d)		RfDI (mg/kg-d)					CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/L)		Migration to Groundwater DAF 20 (mg/kg)	DAF 1 (mg/kg)
		2.0E-003	h			2.0E-003	r	0	0.10	79-11-8	Chloroacetic acid	1.2E+002	nc	1.8E+003	nc	7.3E+000	nc	7.3E+001	nc		
		8.6E-005	r			8.6E-005	r	1		532-27-4	2-Chloroacetophenone	3.3E-002	nc	1.1E-001	nc	3.1E-002	nc	5.2E-002	nc		
		4.0E-003	i			4.0E-003	r	0	0.10	106-47-8	4-Chloroaniline	2.4E+002	nc	3.5E+003	nc	1.5E+001	nc	1.5E+002	nc	7.0E-001	3.0E-002
		2.0E-002	i			1.7E-002	a	1		108-90-7	Chlorobenzene	1.5E+002	nc	5.4E+002	nc	6.2E+001	nc	1.1E+002	nc	1.0E+000	7.0E-002
2.7E-001	h	2.0E-002	i	2.7E-001	h	2.0E-002	r	0	0.10	510-15-6	Chlorobenzilate	1.8E+000	ca	9.1E+000	ca	2.6E-002	ca	2.5E-001	ca		
		2.0E-001	h			2.0E-001	r	0	0.10	74-11-3	p-Chlorobenzoic acid	1.2E+004	nc	1.0E+005	max	7.3E+002	nc	7.3E+003	nc		
		2.0E-002	h			2.0E-002	r	0	0.10	98-56-6	4-Chlorobenzotrifluoride	1.2E+003	nc	1.8E+004	nc	7.3E+001	nc	7.3E+002	nc		
		2.0E-002	h			2.0E-003	h	1		126-99-8	2-Chloro-1,3-butadiene	3.6E+000	nc	1.2E+001	nc	7.3E+000	nc	1.4E+001	nc		
		4.0E-001	h			4.0E-001	r	1		109-69-3	1-Chlorobutane	4.6E+002	sat	4.6E+002	sat	1.5E+003	nc	2.4E+003	nc		
		1.4E+001	r			1.4E+001	i	1		75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	3.4E+002	sat	3.4E+002	sat	5.2E+004	nc	8.7E+004	nc		
		1.4E+001	r			1.4E+001	i	1		75-45-6	Chlorodifluoromethane	3.4E+002	sat	3.4E+002	sat	5.1E+004	nc	8.5E+004	nc		
2.9E-003	a	4.0E-001	n	2.8E-003	r	2.9E+000	i	1		75-00-3	Chloroethane	3.0E+000	ca	6.5E+000	ca	2.3E+000	ca	4.6E+000	ca		
								1		110-75-8	2-Chloroethyl vinyl ether										
6.1E-003	i	1.0E-002	i	6.1E-002	i	6.6E-003	a	1		67-66-3	Chloroform	2.4E-001	ca**	5.2E-001	ca**	8.4E-002	ca**	1.6E-001	ca**	6.0E-001	3.0E-002
1.3E-002	h			6.3E-003	h	6.6E-002	a	1		74-87-3	Chloromethane	1.2E+000	ca	2.7E+000	ca	1.1E+000	ca	1.5E+000	ca		
5.8E-001	h			5.8E-001	r			0	0.10	95-69-2	4-Chloro-2-methylaniline	8.4E-001	ca	4.3E+000	ca	1.2E-002	ca	1.2E-001	ca		
4.6E-001	h			4.6E-001	r			0	0.10	3165-93-3	4-Chloro-2-methylaniline hydrochloride	1.1E+000	ca	5.4E+000	ca	1.5E-002	ca	1.5E-001	ca		
		8.0E-002	i			8.0E-002	r	1		91-58-7	beta-Chloronaphthalene	4.9E+003	nc	2.7E+004	nc	2.9E+002	nc	4.9E+002	nc		
2.5E-002	h			2.5E-002	r		r	1		88-73-3	o-Chloronitrobenzene	8.1E+000	ca	2.3E+001	ca	2.7E-001	ca	4.5E-001	ca		
1.8E-002	h			1.8E-002	r		r	1		100-00-5	p-Chloronitrobenzene	1.1E+001	ca	3.2E+001	ca	3.7E-001	ca	6.2E-001	ca		
		5.0E-003	i			5.0E-003	r	1		95-57-8	2-Chlorophenol	6.3E+001	nc	2.4E+002	nc	1.8E+001	nc	3.0E+001	nc	4.0E+000	2.0E-001
		2.9E-002	r			2.9E-002	h	1		75-29-6	2-Chloropropane	1.7E+002	nc	5.9E+002	nc	1.0E+002	nc	1.7E+002	nc		
1.1E-002	h	1.5E-002	i	1.1E-002	r	1.5E-002	r	0	0.10	1897-45-6	Chlorothalonil	4.4E+001	ca*	2.2E+002	ca*	6.1E-001	ca*	6.1E+000	ca*		
		2.0E-002	i			2.0E-002	r	1		95-49-8	o-Chlorotoluene	1.6E+002	nc	5.7E+002	nc	7.3E+001	nc	1.2E+002	nc		
		2.0E-001	i			2.0E-001	r	0	0.10	101-21-3	Chlorpropham	1.2E+004	nc	1.0E+005	max	7.3E+002	nc	7.3E+003	nc		
		3.0E-003	i			3.0E-003	r	0	0.10	2921-88-2	Chlorpyrifos	1.8E+002	nc	2.6E+003	nc	1.1E+001	nc	1.1E+002	nc		
		1.0E-002	h			1.0E-002	r	0	0.10	5598-13-0	Chlorpyrifos-methyl	6.1E+002	nc	8.8E+003	nc	3.7E+001	nc	3.8E+002	nc		
		5.0E-002	i			5.0E-002	r	0	0.10	64902-72-3	Chlorsulfuron	3.1E+003	nc	4.4E+004	nc	1.8E+002	nc	1.8E+003	nc		
		8.0E-004	h			8.0E-004	r	0	0.10	60238-56-4	Chlorthiophos	4.9E+001	nc	7.0E+002	nc	2.9E+000	nc	2.9E+001	nc		
				4.2E+001	i			0			Total Chromium (1:6 ratio Cr VI:Cr III)	2.1E+002	ca	4.5E+002	ca	1.6E-004	ca			3.8E+001	2.0E+000
		1.5E+000	i							16065-83-1	Chromium III	1.0E+005	max	1.0E+005	max			5.5E+004	nc		
		8.6E-003	i	2.9E+002	i			0		18540-29-9	Chromium VI	3.0E+001	ca**	6.4E+001	ca	2.3E-005	ca	1.1E+002	nc	3.8E+001	2.0E+000
											"CAL-Modified PRG" (PEA, 1994)	2.0E-001						0.16			
		6.0E-002	n							7440-48-4	Cobalt	4.7E+003	nc	1.0E+005	max			2.2E+003	nc		
				2.2E+000	i			0		8007-45-2	Coke Oven Emissions					3.1E-003	ca				
		3.7E-002	h					0		7440-50-8	Copper and compounds	2.9E+003	nc	7.6E+004	nc			1.4E+003	nc		
1.9E+000	h			1.9E+000	r			1		123-73-9	Crotonaldehyde	5.3E-003	ca	1.1E-002	ca	3.5E-003	ca	5.9E-003	ca		
		1.0E-001	i			1.1E-001	i	1		98-82-8	Cumene (isopropylbenzena)	1.6E+002	nc	5.2E+002	nc	4.0E+002	nc	6.6E+002	nc		
8.4E-001	h	2.0E-003	h	8.4E-001	r	2.0E-003	r	0	0.10	21725-46-2	Cyanazine	5.8E-001	ca	2.9E+000	ca	8.0E-003	ca	8.0E-002	ca		
										n/a	Cyanides										
		1.0E-001	h					0	0.10	542-62-1	Barium cyanide	6.1E+003	nc	1.0E+005	max			3.6E+003	nc		
		4.0E-002	i					0	0.10	592-01-8	Calcium cyanide	2.4E+003	nc	3.5E+004	nc			1.5E+003	nc		
		5.0E-003	i					0	0.10	544-92-3	Copper cyanide	3.1E+002	nc	4.4E+003	nc			1.8E+002	nc		
		2.0E-002	i					0	0.10	57-12-5	Free cyanide	1.2E+003	nc	1.8E+004	nc			7.3E+002	nc	4.0E+001	2.0E+000
		2.0E-002	i			8.6E-004	i	1		74-90-8	Hydrogen cyanide	1.1E+001	nc	3.6E+001	nc	3.1E+000	nc	6.2E+000	nc		
		5.0E-002	i					0	0.10	151-50-8	Potassium cyanide	3.1E+003	nc	4.4E+004	nc			1.8E+003	nc		
		2.0E-001	i					0	0.10	506-61-6	Potassium silver cyanide	1.2E+004	nc	1.0E+005	max			7.3E+003	nc		
		1.0E-001	i					0	0.10	506-64-9	Silver cyanide	6.1E+003	nc	8.8E+004	nc			3.6E+003	nc		
		4.0E-002	i					0	0.10	143-33-9	Sodium cyanide	2.4E+003	nc	3.5E+004	nc			1.5E+003	nc		
		5.0E-002	i					0	0.10	557-21-1	Zinc cyanide	3.1E+003	nc	4.4E+004	nc			1.8E+003	nc		
		4.0E-002	i			4.0E-002	r	1		460-19-5	Cyanogen	1.3E+002	nc	4.3E+002	nc	1.5E+002	nc	2.4E+002	nc		
		9.0E-002	i			9.0E-002	r	1		506-68-3	Cyanogen bromide	2.9E+002	nc	9.7E+002	nc	3.3E+002	nc	5.5E+002	nc		
		5.0E-002	i			5.0E-002	r	1		506-77-4	Cyanogen chloride	1.6E+002	nc	5.4E+002	nc	1.8E+002	nc	3.0E+002	nc		
		5.0E+000	i			5.0E+000	r	0	0.10	108-94-1	Cyclohexanone	1.0E+005	max	1.0E+005	max	1.8E+004	nc	1.8E+005	nc		

Key : i=IRIS n=NCEA h=HEAST x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION								CONTAMINANT				PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS Migration to Ground Water	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		V O C	skin abs soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
2.3E+002	i	3.0E-003	i	2.3E+002	i	3.0E-003	r	0	0.10	92-87-5	Benzidine	2.1E-003	ca	1:1E-002	ca	2.9E-005	ca	2.9E-004	ca		
		4.0E+000	i			4.0E+000	r	0	0.10	65-85-0	Benzoic acid	1.0E+005	max	1.0E+005	max	1.5E+004	nc	1.5E+005	nc	4.0E+002	2.0E+001
1.3E+001	i			1.3E+001	r			0	0.10	98-07-7	Benzotrichloride	3.7E-002	ca	1.9E-001	ca	5.2E-004	ca	5.2E-003	ca		
		3.0E-001	h			3.0E-001	r	0	0.10	100-51-6	Benzyl alcohol	1.8E+004	nc	1.0E+005	max	1.1E+003	nc	1.1E+004	nc		
1.7E-001	i			1.7E-001	r			1		100-44-7	Benzyl chloride	8.9E-001	ca	2.3E+000	ca	4.0E-002	ca	6.6E-002	ca		
		2.0E-003	i	8.4E+000	i	5.7E-006	i	0		7440-41-7	Beryllium and compounds	1.5E+002	nc	2.2E+003	ca**	8.0E-004	ca*	7.3E+001	nc	6.3E+001	3.0E+000
		1.0E-004	i			1.0E-004	r	0	0.10	141-66-2	Bidrin	6.1E+000	nc	8.8E+001	nc	3.7E-001	nc	3.6E+000	nc		
		1.5E-002	i			1.5E-002	r	0	0.10	82657-04-3	Biphenthrin (Talstar)	9.2E+002	nc	1.3E+004	nc	5.5E+001	nc	5.5E+002	nc		
		5.0E-002	i			5.0E-002	r	1		92-52-4	1,1-Biphenyl	3.5E+002	sat	3.5E+002	sat	1.8E+002	nc	3.0E+002	nc		
1.1E+000	i			1.2E+000	i			1		111-44-4	Bis(2-chloroethyl)ether	2.1E-001	ca	6.2E-001	ca	5.8E-003	ca	9.8E-003	ca	4.0E-004	2.0E-005
7.0E-002	h	4.0E-002	i	3.5E-002	h	4.0E-002	r	1		108-60-1	Bis(2-chloroisopropyl)ether	2.9E+000	ca	8.1E+000	ca	1.9E-001	ca	2.7E-001	ca		
2.2E+002	i			2.2E+002	i			1		542-88-1	Bis(chloromethyl)ether	1.9E-004	ca	4.4E-004	ca	3.1E-005	ca	5.2E-005	ca		
7.0E-002	h			3.5E-002	h			0	0.10	108-60-1	Bis(2-chloro-1-methylethyl)ether	6.9E+000	ca	3.5E+001	ca	1.9E-001	ca	9.6E-001	ca		
1.4E-002	i	2.0E-002	i	1.4E-002	r	2.2E-002	r	0	0.10	117-81-7	Bis(2-ethylhexyl)phthalate (DEHP)	3.5E+001	ca*	1.8E+002	ca	4.8E-001	ca	4.8E+000	ca		
		5.0E-002	i			5.0E-002	r	0	0.10	80-05-7	Bisphenol A	3.1E+003	nc	4.4E+004	nc	1.8E+002	nc	1.8E+003	nc		
		9.0E-002	i			5.7E-003	h	0	0.10	7440-42-8	Boron	5.5E+003	nc	7.9E+004	nc	2.1E+001	nc	3.3E+003	nc		
						2.0E-004	h	0	0.10	7637-07-2	Boron trifluoride					7.3E-001	nc				
		2.0E-002	n			2.9E-003	n	1		108-86-1	Bromobenzene	2.8E+001	nc	9.2E+001	nc	1.0E+001	nc	2.0E+001	nc		
6.2E-002	i	2.0E-002	i	6.2E-002	r	2.0E-002	r	1		75-27-4	Bromodichloromethane	1.0E+000	ca	2.4E+000	ca	1.1E-001	ca	1.8E-001	ca	6.0E-001	3.0E-002
7.9E-003	i	2.0E-002	i	3.9E-003	i	2.0E-002	r	0	0.10	75-25-2	Bromoform (tribromomethane)	6.2E+001	ca*	3.1E+002	ca*	1.7E+000	ca*	8.5E+000	ca*	8.0E-001	4.0E-002
		1.4E-003	i			1.4E-003	i	1		74-83-9	Bromomethane (Methyl bromide)	3.9E+000	nc	1.3E+001	nc	5.2E+000	nc	8.7E+000	nc	2.0E-001	1.0E-002
								0	0.10	101-55-3	4-Bromophenyl phenyl ether										
		5.0E-003	h			5.0E-003	r	0	0.10	2104-96-3	Bromophos	3.1E+002	nc	4.4E+003	nc	1.8E+001	nc	1.8E+002	nc		
		2.0E-002	i			2.0E-002	r	0	0.10	1689-84-5	Bromoxynil	1.2E+003	nc	1.8E+004	nc	7.3E+001	nc	7.3E+002	nc		
		2.0E-002	i			2.0E-002	r	0	0.10	1689-99-2	Bromoxynil octanoate	1.2E+003	nc	1.8E+004	nc	7.3E+001	nc	7.3E+002	nc		
1.8E+000	r			1.8E+000	i			1		106-99-0	1,3-Butadiene	3.5E-003	ca	7.6E-003	ca	3.7E-003	ca	6.2E-003	ca		
		1.0E-001	i			1.0E-001	r	0	0.10	71-36-3	1-Butanol	6.1E+003	nc	8.8E+004	nc	3.7E+002	nc	3.6E+003	nc	1.7E+001	9.0E-001
		5.0E-002	i			5.0E-002	r	0	0.10	2008-41-5	Butylate	3.1E+003	nc	4.4E+004	nc	1.8E+002	nc	1.8E+003	nc		
		1.0E-002	n			1.0E-002	r	1		104-51-8	n-Butylbenzene	1.4E+002	nc	2.4E+002	sat	3.7E+001	nc	6.1E+001	nc		
		1.0E-002	n			1.0E-002	r	1		135-9-88	sec-Butylbenzene	1.1E+002	nc	2.2E+002	sat	3.7E+001	nc	6.1E+001	nc		
		1.0E-002	n			1.0E-002	r	1		98-06-6	tert-Butylbenzene	1.3E+002	nc	3.9E+002	sat	3.7E+001	nc	6.1E+001	nc		
		2.0E-001	i			2.0E-001	r	0	0.10	85-68-7	Butyl benzyl phthalate	1.2E+004	nc	1.0E+005	max	7.3E+002	nc	7.3E+003	nc	9.3E+002	8.1E+002
		1.0E+000	i			1.0E+000	r	0	0.10	85-70-1	Butylphthalyl butylglycolate	6.1E+004	nc	1.0E+005	max	3.7E+003	nc	3.6E+004	nc		
		3.0E-003	h			3.0E-003	r	0	0.10	75-60-5	Cacodylic acid	1.8E+002	nc	2.6E+003	nc	1.1E+001	nc	1.1E+002	nc		
		5.0E-004	i	6.3E+000	i			0	0.001	7440-43-9	Cadmium and compounds	3.7E+001	nc	8.1E+002	nc	1.1E-003	ca	1.8E+001	nc	8.0E+000	4.0E-001
											"CAL-Modified PRG" (PEA, 1994)	9.0E+000									
		5.0E-001	i			5.0E-001	r	0	0.10	105-60-2	Caprolactam	3.1E+004	nc	1.0E+005	max	1.8E+003	nc	1.8E+004	nc		
8.6E-003	h	2.0E-003	i	8.6E-003	r	2.0E-003	r	0	0.10	2425-06-1	Captafol	5.7E+001	ca**	2.9E+002	ca**	7.8E-001	ca**	7.8E+000	ca**		
3.5E-003	h	1.3E-001	i	3.5E-003	r	1.3E-001	r	0	0.10	133-06-2	Captan	1.4E+002	ca*	7.0E+002	ca	1.9E+000	ca	1.9E+001	ca		
		1.0E-001	i			1.1E-001	r	0	0.10	63-25-2	Carbaryl	6.1E+003	nc	8.8E+004	nc	4.0E+002	nc	3.6E+003	nc		
2.0E-002	h			2.0E-002	r			0	0.10	86-74-8	Carbazole	2.4E+001	ca	1.2E+002	ca	3.4E-001	ca	3.4E+000	ca	6.0E-001	3.0E-002
		5.0E-003	i			5.0E-003	r	0	0.10	1563-66-2	Carbofuran	3.1E+002	nc	4.4E+003	nc	1.8E+001	nc	1.8E+002	nc		
		1.0E-001	i			2.0E-001	i	1		75-15-0	Carbon disulfide	3.6E+002	nc	7.2E+002	sat	7.3E+002	nc	1.0E+003	nc	3.2E+001	2.0E+000
1.3E-001	i	7.0E-004	i	5.3E-002	i	7.0E-004	r	1		56-23-5	Carbon tetrachloride	2.4E-001	ca**	5.3E-001	ca*	1.3E-001	ca*	1.7E-001	ca*	7.0E-002	3.0E-003
		1.0E-002	i			1.0E-002	r	0	0.10	55285-14-8	Carbosulfan	6.1E+002	nc	8.8E+003	nc	3.7E+001	nc	3.6E+002	nc		
		1.0E-001	i			1.0E-001	r	0	0.10	5234-68-4	Carboxin	6.1E+003	nc	8.8E+004	nc	3.7E+002	nc	3.6E+003	nc		
		2.0E-003	i			2.0E-003	r	0	0.10	302-17-0	Chloral	1.2E+002	nc	1.8E+003	nc	7.3E+000	nc	7.3E+001	nc		
		1.5E-002	i			1.5E-002	r	0	0.10	133-90-4	Chloramben	9.2E+002	nc	1.3E+004	nc	5.5E+001	nc	5.5E+002	nc		
4.0E-001	h			4.0E-001	r			0	0.10	118-75-2	Chloranil	1.2E+000	ca	6.1E+000	ca	1.7E-002	ca	1.7E-001	ca		
3.5E-001	i	5.0E-004	i	3.5E-001	i	2.0E-004	i	0	0.04	12789-03-6	Chlordane	1.6E+000	ca*	1.1E+001	ca*	1.9E-002	ca*	1.9E-001	ca*	1.0E+001	5.0E-001
		2.0E-002	i			2.0E-002	r	0	0.10	90982-32-4	Chlorimuron-ethyl	1.2E+003	nc	1.8E+004	nc	7.3E+001	nc	7.3E+002	nc		
		1.0E-001	i							7782-50-5	Chlorine							3.6E+003	nc		
						5.7E-005	i			10049-04-4	Chlorine dioxide					2.1E-001	nc				
								1		107-20-0	Chloroacetaldehyde										

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FOR PLANNING PURPOSES

TOXICITY INFORMATION										CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
											Residential		Industrial		Ambient Air		Tap Water		Migration to Groundwater	
RfD (mg/kg-d)		RfC (mg/kg-d)		RfD (mg/kg-d)		Oral Slope Factor (mg/kg-d)-1	Inhal Unit Risk (ug/m3)-1	CAS No.		Soil (mg/kg)		Soil (mg/kg)		(ug/m3)		(ug/l)		SSL (mg/kg)	
8.7E-003	i	4.0E-003	i	8.7E-003	r	4.0E-003	r	0	0.10	30560-19-1	Acephate	5.6E+001	ca**	2.8E+002	ca*	7.7E-001	ca*	7.7E+000	ca*	
				7.7E-003	i	7.6E-003	i	1		75-07-0	Acetaldehyde	1.1E+001	ca**	2.3E+001	ca**	8.7E-001	ca*	1.7E+000	ca	
		2.0E-002	i			2.0E-002	r	0	0.10	34256-82-1	Acetochlor	1.2E+003	nc	1.8E+004	nc	7.3E+001	nc	7.3E+002	nc	
		1.0E-001	i			1.0E-001	r	1		67-64-1	Acetone	1.6E+003	nc	8.2E+003	nc	3.7E+002	nc	6.1E+002	nc	1.6E+001 8.0E-001
		8.0E-004	h			8.0E-004	r	0	0.10	75-86-5	Acetone cyanohydrin	4.9E+001	nc	7.0E+002	nc	2.9E+000	nc	2.9E+001	nc	
		6.0E-003	a			1.7E-002	i	1		75-05-8	Acetonitrile	2.7E+002	nc	1.7E+003	nc	6.2E+001	nc	7.9E+001	nc	
		1.0E-001	i			5.7E-006	x	1		98-86-2	Acetophenone	4.9E-001	nc	1.8E+000	nc	2.1E-002	nc	4.2E-002	nc	
1.1E-001	o	1.3E-002	i	1.1E-001	r	1.3E-002	r	0	0.10	50594-66-6	Acifluorfen	4.4E+000	ca	2.2E+001	ca	6.1E-002	ca	6.1E-001	ca	
		2.0E-002	h			5.7E-006	x	1		107-02-8	Acrolein	1.0E-001	nc	3.4E-001	nc	2.1E-002	nc	4.2E-002	nc	
4.6E+000	i	2.0E-004	i	4.6E+000	i	2.0E-004	r	0	0.10	79-06-1	Acrylamide	1.1E-001	ca	5.4E-001	ca	1.5E-003	ca	1.5E-002	ca	
		5.0E-001	i			2.9E-004	i	0	0.10	79-10-7	Acrylic acid	2.9E+004	nc	1.0E+005	max	1.0E+000	nc	1.8E+004	nc	
5.4E-001	i	1.0E-003	h	2.4E-001	i	5.7E-004	r	1		107-13-1	Acrylonitrile	2.1E-001	ca*	5.1E-001	ca*	2.8E-002	ca*	3.9E-002	ca*	
8.1E-002	h	1.0E-002	i	8.0E-002	s	1.0E-002	r	0	0.10	15972-60-8	Alachlor	6.0E+000	ca	3.1E+001	ca	8.4E-002	ca	8.4E-001	ca	
		1.5E-001	i			1.5E-001	r	0	0.10	1596-84-5	Alar	9.2E+003	nc	1.0E+005	max	5.5E+002	nc	5.5E+003	nc	
		1.0E-003	i			1.0E-003	r	0	0.10	116-06-3	Aldicarb	6.1E+001	nc	8.8E+002	nc	3.7E+000	nc	3.6E+001	nc	
		1.0E-003	i			1.0E-003	r	0	0.10	1646-88-4	Aldicarb sulfone	6.1E+001	nc	8.8E+002	nc	3.7E+000	nc	3.6E+001	nc	
1.7E+001	i	3.0E-005	i	1.7E+001	i	3.0E-005	r	0	0.10	309-00-2	Aldrin	2.9E-002	ca*	1.5E-001	ca	3.9E-004	ca	4.0E-003	ca	1.2E+004 5.9E+002
		2.5E-001	i			2.5E-001	r	0	0.10	5585-64-6	Alfy	1.5E+004	nc	1.0E+005	max	9.1E+002	nc	9.1E+003	nc	
		5.0E-003	i			5.0E-003	r	0	0.10	107-18-6	Allyl alcohol	3.1E+002	nc	4.4E+003	nc	1.8E+001	nc	1.8E+002	nc	
		5.0E-002	h			2.9E-004	i	0	0.10	107-05-1	Allyl chloride	3.0E+003	nc	4.3E+004	nc	1.0E+000	nc	1.8E+003	nc	
		1.0E+000	n			1.4E-003	a	0		7429-90-5	Aluminum	7.6E+004	nc	1.0E+005	max	5.1E+000	nc	3.6E+004	nc	
		4.0E-004	i					0		20859-73-8	Aluminum phosphide	3.1E+001	nc	8.2E+002	nc			1.5E+001	nc	
		3.0E-004	i			3.0E-004	r	0	0.10	67485-29-4	Amdro	1.8E+001	nc	2.6E+002	nc	1.1E+000	nc	1.1E+001	nc	
		9.0E-003	i			9.0E-003	r	0	0.10	834-12-8	Ametryn	5.5E+002	nc	7.9E+003	nc	3.3E+001	nc	3.3E+002	nc	
		7.0E-002	h			7.0E-002	r	0	0.10	591-27-5	m-Aminophenol	4.3E+003	nc	6.2E+004	nc	2.6E+002	nc	2.6E+003	nc	
		2.0E-005	h			2.0E-005	r	0	0.10	504-24-5	4-Aminopyridine	1.2E+000	nc	1.8E+001	nc	7.3E-002	nc	7.3E-001	nc	
		2.5E-003	i			2.5E-003	r	0	0.10	33089-61-1	Amitraz	1.5E+002	nc	2.2E+003	nc	9.1E+000	nc	9.1E+001	nc	
						2.9E-002	i			7664-41-7	Ammonia					1.0E+002	nc			
		2.0E-001	i					0	0.10	7773-06-0	Ammonium sulfamate	1.2E+004	nc	1.0E+005	max			7.3E+003	nc	
5.7E-003	i	7.0E-003	n	5.7E-003	r	2.9E-004	i	0	0.10	62-53-3	Aniline	8.5E+001	ca**	4.3E+002	ca*	1.0E+000	nc	1.2E+001	ca*	
		4.0E-004	i					0		7440-36-0	Antimony and compounds	3.1E+001	nc	8.2E+002	nc			1.5E+001	nc	5.0E+000 3.0E-001
		5.0E-004	h					0		1314-60-9	Antimony pentoxide	3.9E+001	nc	1.0E+003	nc			1.8E+001	nc	
		8.0E-004	h					0		28300-74-5	Antimony potassium tartrate	7.0E+001	nc	1.8E+003	nc			3.3E+001	nc	
		4.0E-004	h					0		1332-81-6	Antimony tetroxide	3.1E+001	nc	8.2E+002	nc			1.5E+001	nc	
		4.0E-004	h			8.7E-005	i	0		1309-64-4	Antimony trioxide	3.1E+001	nc	8.2E+002	nc	2.1E-001	nc	1.5E+001	nc	
		1.3E-002	i			1.3E-002	i	0	0.10	74115-24-5	Apollo	7.9E+002	nc	1.1E+004	nc	4.7E+001	nc	4.7E+002	nc	
2.5E-002	i	5.0E-002	h	2.5E-002	i	5.0E-002	r	0	0.10	140-57-8	Aramite	1.9E+001	ca	9.9E+001	ca	2.7E-001	ca	2.7E+000	ca	
		3.0E-004	i					0	0.03	7440-38-2	Arsenic (noncancer endpoint)	2.2E+001	nc	4.4E+002	nc					
1.5E+000	i	3.0E-004	i	1.5E+001	i			0	0.03	7440-38-2	Arsenic (cancer endpoint)	3.9E-001	ca*	2.7E+000	ca	4.5E-004	ca	4.5E-002	ca	2.9E+001 1.0E+000
						1.4E-005	i			7784-42-1	Arsine (see arsenic for cancer endpoint)					5.2E-002	nc			
		9.0E-003	i			9.0E-003	r	0	0.10	76578-12-6	Assure	5.5E+002	nc	7.9E+003	nc	3.3E+001	nc	3.3E+002	nc	
		5.0E-002	i			5.0E-002	r	0	0.10	3337-71-1	Asulam	3.1E+003	nc	4.4E+004	nc	1.8E+002	nc	1.8E+003	nc	
2.2E-001	h	3.5E-002	h	2.2E-001	i	3.5E-002	r	0	0.10	1912-24-9	Atrazine	2.2E+000	ca	1.1E+001	ca	3.1E-002	ca	3.0E-001	ca	
		4.0E-004	i			4.0E-004	r	0	0.10	71751-41-2	Avermectin B1	2.4E+001	nc	3.5E+002	nc	1.5E+000	nc	1.5E+001	nc	
1.1E-001	i			1.1E-001	i			0	0.10	103-33-3	Azobenzene	4.4E+000	ca	2.2E+001	ca	6.2E-002	ca	6.1E-001	ca	
		7.0E-002	i			1.4E-004	h	0		7440-39-3	Barium and compounds	5.4E+003	nc	1.0E+005	max	5.2E-001	nc	2.6E+003	nc	1.6E+003 8.2E+001
		4.0E-003	i			4.0E-003	r	0	0.10	114-26-1	Baygon	2.4E+002	nc	3.5E+003	nc	1.5E+001	nc	1.5E+002	nc	
		3.0E-002	i			3.0E-002	r	0	0.10	43121-43-3	Bayleton	1.8E+003	nc	2.6E+004	nc	1.1E+002	nc	1.1E+003	nc	
		2.5E-002	i			2.5E-002	r	0	0.10	68359-37-5	Baythroid	1.5E+003	nc	2.2E+004	nc	9.1E+001	nc	9.1E+002	nc	
		3.0E-001	i			3.0E-001	r	0	0.10	1861-40-1	Benefin	1.8E+004	nc	1.0E+005	max	1.1E+003	nc	1.1E+004	nc	
		5.0E-002	i			5.0E-002	r	0	0.10	17804-35-2	Benomyl	3.1E+003	nc	4.4E+004	nc	1.8E+002	nc	1.8E+003	nc	
		3.0E-002	i			3.0E-002	r	0	0.10	25057-89-0	Bentazon	1.8E+003	nc	2.6E+004	nc	1.1E+002	nc	1.1E+003	nc	
		1.0E-001	i			1.0E-001	r	0	0.10	100-52-7	Benzaldehyde	6.1E+003	nc	8.8E+004	nc	3.7E+002	nc	3.6E+003	nc	
2.9E-002	i	3.0E-003	n	2.7E-002	i	1.7E-003	n	1		71-43-2	Benzene	8.7E-001	ca*	1.5E+000	ca*	2.5E-001	ca*	4.1E-001	ca*	3.0E-002 2.0E-003

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FOR PLANNING PURPOSES

TOXICITY INFORMATION										CONTAMINANT		PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
																				Migration to Ground Water	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		5.0E-002	n			1.7E-003	n	1		95-63-6	1,2,4-Trimethylbenzene	5.7E+000	sat	5.7E+000	sat	6.2E+000	nc	1.2E+001	nc		
		5.0E-002	n			1.7E-003	n	1		108-67-8	1,3,5-Trimethylbenzene	2.1E+001	nc	7.0E+001	nc	6.2E+000	nc	1.2E+001	nc		
3.7E-002	h			3.7E-002	r			0	0.10	512-56-1	Trimethyl phosphate	1.3E+001	ca	6.7E+001	ca	1.8E-001	ca	1.8E+000	ca		
		3.0E-002	i			3.0E-002	r	0	0.10	99-35-4	1,3,5-Trinitrobenzene	1.8E+003	nc	2.6E+004	nc	1.1E+002	nc	1.1E+003	nc		
		1.0E-002	h			1.0E-002	r	0	0.10	479-45-8	Trinitrophenylmethylnitramine	6.1E+002	nc	8.8E+003	nc	3.7E+001	nc	3.6E+002	nc		
0.03	i	5.0E-004	i	0.03	r	5.0E-004	r	0	0.10	118-96-7	2,4,6-Trinitrotoluene	1.6E+001	ca**	8.2E+001	ca**	2.2E-001	ca**	2.2E+000	ca**		
		7.0E-003	h					0		7440-62-2	Vanadium	5.5E+002	nc	1.4E+004	nc			2.6E+002	nc	6.0E+003	3.0E+002
		9.0E-003	i					0		1314-62-1	Vanadium pentoxide	7.0E+002	nc	1.8E+004	nc			3.3E+002	nc	6.0E+003	3.0E+002
		2.0E-002	h					0		13701-70-7	Vanadium sulfate	1.8E+003	nc	4.1E+004	nc			7.3E+002	nc	6.0E+003	3.0E+002
		1.0E-003	i			1.0E-003	r	0	0.10	1929-77-7	Vernam	6.1E+001	nc	8.8E+002	nc	3.7E+000	nc	3.6E+001	nc		
		2.5E-002	i			2.5E-002	r	0	0.10	50471-44-8	Vinclozolin	1.5E+003	nc	2.2E+004	nc	9.1E+001	nc	9.1E+002	nc		
		1.0E+000	h			5.7E-002	i	1		108-05-4	Vinyl acetate	4.3E+002	nc	1.4E+003	nc	2.1E+002	nc	4.1E+002	nc	1.7E+002	8.0E+000
1.1E-001	r	8.6E-004	r	1.1E-001	h	8.6E-004	i	1		593-60-2	Vinyl bromide (bromoethene)	1.9E-001	ca*	4.2E-001	ca*	6.1E-002	ca*	1.0E-001	ca*		
1.9E+000	h			3.0E-001	h			1		75-01-4	Vinyl chloride	2.2E-002	ca	4.9E-002	ca	2.2E-002	ca	2.0E-002	ca	1.0E-002	7.0E-004
		3.0E-004	i			3.0E-004	r	0	0.10	81-81-2	Warfarin	1.8E+001	nc	2.6E+002	nc	1.1E+000	nc	1.1E+001	nc		
		2.0E+000	i			2.0E-001	x	1	0.10	1330-20-7	Xylenes	2.1E+002	sat	2.1E+002	sat	7.3E+002	nc	1.4E+003	nc	2.1E+002	1.0E+001
		3.0E-001	i					0		7440-66-6	Zinc	2.3E+004	nc	1.0E+005	max			1.1E+004	nc	1.2E+004	6.2E+002
		3.0E-004	i					0		1314-84-7	Zinc phosphide	2.3E+001	nc	6.1E+002	nc			1.1E+001	nc		
		5.0E-002	i			5.0E-002	r	0	0.10	12122-67-7	Zineb	3.1E+003	nc	4.4E+004	nc	1.8E+002	nc	1.8E+003	nc		

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FOR PLANNING PURPOSES

TOXICITY INFORMATION										CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)						SOIL SCREENING LEVELS	
SFo (mg/kg-d)-1		RfDo (mg/kg-d)		RfDi ((mg/kg-d)		RfDo (mg/kg-d)		C	Abs	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Migration to Groundwater (mg/kg)		Migration to Groundwater (mg/kg)
		2.5E-005	h			2.5E-005	r	0	0.10	13071-79-9	Terbufos	1.5E+000	nc	2.2E+001	nc	9.1E-002	nc	9.1E-001	nc	
		1.0E-003	i			1.0E-003	r	0	0.10	886-50-0	Terbutryn	6.1E+001	nc	8.8E+002	nc	3.7E+000	nc	3.6E+001	nc	
		3.0E-004	i			3.0E-004	r	0	0.10	95-94-3	1,2,4,5-Tetrachlorobenzene	1.8E+001	nc	2.6E+002	nc	1.1E+000	nc	1.1E+001	nc	
2.6E-002	i	3.0E-002	i	2.6E-002	r	3.0E-002	r	1		630-20-6	1,1,1,2-Tetrachloroethane	3.0E+000	ca	7.0E+000	ca	2.6E-001	ca	4.3E-001	ca	
2.0E-001	i	6.00E-002	a	2.0E-001	i	6.00E-002	r	1		79-34-5	1,1,2,2-Tetrachloroethane	3.8E-001	ca	9.0E-001	ca	3.3E-002	ca	5.5E-002	ca	3.0E-003	2.0E-004
5.2E-002	n	1.0E-002	i	2.0E-003	n	1.1E-001	n	1		127-18-4	Tetrachloroethylene (PCE)	5.7E+000	ca*	1.9E+001	ca*	3.3E+000	ca	1.1E+000	ca	6.0E-002	3.0E-003
											"CAL-Modified PRG" (PEA, 1994)					3.2E-001			
		3.0E-002	i			3.0E-002	r	0	0.10	58-90-2	2,3,4,6-Tetrachlorophenol	1.8E+003	nc	2.6E+004	nc	1.1E+002	nc	1.1E+003	nc		
2.0E+001	h			2.0E+001	r			0	0.10	5216-25-1	p,a,a,a-Tetrachlorotoluene	2.4E-002	ca	1.2E-001	ca	3.4E-004	ca	3.4E-003	ca		
2.4E-002	h	3.0E-002	i	2.4E-002	r	3.0E-002	r	0	0.10	961-11-5	Tetrachlorovinphos	2.0E+001	ca*	1.0E+002	ca	2.8E-001	ca	2.8E+000	ca		
		5.0E-004	i			5.0E-004	r	0	0.10	3689-24-5	Tetraethyldithiopyrophosphate	3.1E+001	nc	4.4E+002	nc	1.8E+000	nc	1.8E+001	nc		
7.6E-003	n	2.1E-001	n	6.8E-003	n	8.6E-002	n	0	0.10	109-99-9	Tetrahydrofuran	6.4E+001	ca	3.2E+002	ca	9.9E-001	ca	8.8E+000	ca		
		7.0E-005	x					0		1314-32-5	Thallic oxide	5.5E+000	nc	1.4E+002	nc			2.6E+000	nc		
		8.0E-005	i					0		563-68-8	Thallium acetate	7.0E+000	nc	1.8E+002	nc			3.3E+000	nc	7.0E-001	4.0E-001
		8.0E-005	i					0		6533-73-9	Thallium carbonate	6.3E+000	nc	1.6E+002	nc			2.9E+000	nc	7.0E-001	4.0E-001
		8.0E-005	i					0		7791-12-0	Thallium chloride	6.3E+000	nc	1.6E+002	nc			2.9E+000	nc	7.0E-001	4.0E-001
		9.0E-005	i					0		10102-45-1	Thallium nitrate	7.0E+000	nc	1.8E+002	nc			3.3E+000	nc	7.0E-001	4.0E-001
		9.0E-005	x					0		12039-52-0	Thallium selenite	7.0E+000	nc	1.8E+002	nc			3.3E+000	nc	7.0E-001	4.0E-001
		8.0E-005	i					0		7446-18-6	Thallium sulfate	6.3E+000	nc	1.6E+002	nc			2.9E+000	nc	7.0E-001	4.0E-001
		1.0E-002	i			1.0E-002	r	0	0.10	28249-77-6	Thiobencarb	6.1E+002	nc	8.8E+003	nc	3.7E+001	nc	3.6E+002	nc		
		1.0E-001	n			1.0E-001	r	0	0.10	N/A	Thiocyanate	6.1E+003	nc	1.0E+005	max	3.7E+002	nc	3.6E+003	nc		
		3.0E-004	h			3.0E-004	r	0	0.10	39196-18-4	Thiofanox	1.8E+001	nc	2.6E+002	nc	1.1E+000	nc	1.1E+001	nc		
		8.0E-002	i			8.0E-002	r	0	0.10	23564-05-8	Thiophanate-methyl	4.9E+003	nc	7.0E+004	nc	2.9E+002	nc	2.9E+003	nc		
		5.0E-003	i			5.0E-003	r	0	0.10	137-26-8	Thiram	3.1E+002	nc	4.4E+003	nc	1.8E+001	nc	1.8E+002	nc		
		6.0E-001	h					0			Tin (inorganic, see tributyltin oxide for organic tin)	4.7E+004	nc	1.0E+005	max			2.2E+004	nc		
		2.0E-001	i			1.1E-001	h	1		108-88-3	Toluene	5.2E+002	sat	5.2E+002	sat	4.0E+002	nc	7.2E+002	nc	1.2E+001	6.0E-001
3.2E+000	h			3.2E+000	r			0	0.10	95-80-7	Toluene-2,4-diamine	1.5E-001	ca	7.7E-001	ca	2.1E-003	ca	2.1E-002	ca		
		6.0E-001	h			6.0E-001	r	0	0.10	95-70-5	Toluene-2,5-diamine	3.7E+004	nc	1.0E+005	max	2.2E+003	nc	2.2E+004	nc		
		2.0E-001	h			2.0E-001	r	0	0.10	823-40-5	Toluene-2,6-diamine	1.2E+004	nc	1.0E+005	max	7.3E+002	nc	7.3E+003	nc		
0.19	i			0.19	r			0	0.10	106-49-0	p-Toluidine	2.6E+000	ca	1.3E+001	ca	3.5E-002	ca	3.5E-001	ca		
1.1E+000	i			1.1E+000	i			0	0.10	8001-35-2	Toxaphene	4.4E-001	ca	2.2E+000	ca	6.0E-003	ca	6.1E-002	ca	3.1E+001	2.0E+000
		7.5E-003	i			7.5E-003	r	0	0.10	66841-25-6	Tralomethrin	4.6E+002	nc	6.6E+003	nc	2.7E+001	nc	2.7E+002	nc		
		1.3E-002	i			1.3E-002	r	0	0.10	2303-17-5	Triallate	7.9E+002	nc	1.1E+004	nc	4.7E+001	nc	4.7E+002	nc		
		1.0E-002	i			1.0E-002	r	0	0.10	82097-50-5	Triasulfuron	6.1E+002	nc	8.8E+003	nc	3.7E+001	nc	3.6E+002	nc		
		5.0E-003	i			5.0E-003	r	0	0.10	615-54-3	1,2,4-Tribromobenzene	3.1E+002	nc	4.4E+003	nc	1.8E+001	nc	1.8E+002	nc		
		3.0E-004	i					0	0.10	56-35-9	Tributyltin oxide (TBTO)	1.8E+001	nc	2.6E+002	nc			1.1E+001	nc		
3.4E-002	h			3.4E-002	r			0	0.10	634-93-5	2,4,6-Trichloroaniline	1.4E+001	ca	7.3E+001	ca	2.0E-001	ca	2.0E+000	ca		
2.9E-002	h			2.9E-002	r			0	0.10	33663-50-2	2,4,6-Trichloroaniline hydrochloride	1.7E+001	ca	8.5E+001	ca	2.3E-001	ca	2.3E+000	ca		
		1.0E-002	i			5.7E-002	h	1		120-82-1	1,2,4-Trichlorobenzene	6.5E+002	nc	3.0E+003	sat	2.1E+002	nc	1.9E+002	nc	5.0E+000	3.0E-001
		3.5E-002	n			2.8E-001	n	1		71-55-6	1,1,1-Trichloroethane	7.7E+002	nc	1.4E+003	sat	1.0E+003	nc	7.9E+002	nc	2.0E+000	1.0E-001
5.7E-002	i	4.0E-003	i	5.6E-002	i	4.0E-003	r	1		79-00-5	1,1,2-Trichloroethane	8.4E-001	ca*	1.9E+000	ca*	1.2E-001	ca	2.0E-001	ca	2.0E-002	9.0E-004
1.1E-002	n	6.0E-003	x	6.0E-003	n	6.0E-003	r	1		79-01-6	Trichloroethylene (TCE)	2.8E+000	ca**	6.1E+000	ca*	1.1E+000	ca*	1.6E+000	ca*	6.0E-002	3.0E-003
		3.0E-001	i			2.0E-001	h	1		75-69-4	Trichlorofluoromethane	3.9E+002	nc	2.0E+003	sat	7.3E+002	nc	1.3E+003	nc		
		1.0E-001	i			1.0E-001	r	0	0.10	95-95-4	2,4,5-Trichlorophenol	6.1E+003	nc	8.8E+004	nc	3.7E+002	nc	3.6E+003	nc	2.7E+002	1.4E+001
1.1E-002	i			1.1E-002	i			0	0.10	88-06-2	2,4,6-Trichlorophenol	4.4E+001	ca	2.2E+002	ca	6.2E-001	ca	6.1E+000	ca	2.0E-001	8.0E-003
		1.0E-002	i			1.0E-002	r	0	0.10	93-76-5	2,4,5-Trichlorophenoxyacetic Acid	6.1E+002	nc	8.8E+003	nc	3.7E+001	nc	3.6E+002	nc		
		8.0E-003	i			8.0E-003	r	0	0.10	93-72-1	2-(2,4,5-Trichlorophenoxy) propionic acid	4.9E+002	nc	7.0E+003	nc	2.9E+001	nc	2.9E+002	nc		
		5.0E-003	i			5.0E-003	r	1		598-77-6	1,1,2-Trichloropropane	1.5E+001	nc	5.1E+001	nc	1.8E+001	nc	3.0E+001	nc		
7.0E+000	h	6.0E-003	i	7.0E+000	r	5.9E-003	r	1		96-18-4	1,2,3-Trichloropropane	1.4E-003	ca	3.1E-003	ca	9.6E-004	ca	1.6E-003	ca		
		5.0E-003	h			5.0E-003	r	1		96-19-5	1,2,3-Trichloropropene	1.2E+001	nc	3.9E+001	nc	1.8E+001	nc	3.0E+001	nc		
		3.0E+001	i			8.5E-000	h	1		76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.6E+003	sat	5.6E+003	sat	3.1E+004	nc	5.9E+004	nc		
		3.0E-003	i			3.0E-003	r	0	0.10	58138-08-2	Tridiphane	1.8E+002	nc	2.6E+003	nc	1.1E+001	nc	1.1E+002	nc		
		2.0E-009	r			2.0E-003	i	1		121-44-8	Triethylamine	2.3E+001	nc	8.8E+001	nc	7.3E+000	nc	1.2E+001	nc		
7.7E-003	i	7.5E-003	i	7.7E-003	r	7.5E-003	r	0	0.10	1582-09-8	Trifluralin	6.3E+001	ca**	3.2E+002	ca*	8.7E-001	ca*	8.7E+000	ca*		

EPA Region VIII CWA § 304(a) Criteria Chart Indicating
Published Criteria and Updated Human Health Values.

Current as of July 1, 1993

PRIORITY TOXIC POLLUTANTS

	Chemical Name	CASRN	Aquatic Life Criteria CMC	Aquatic Life Criteria CCC	Human Health Criteria Date	Human Health Criteria Water+Fish	Human Health Criteria Fish	Published § 304(a) Human Health Values* Water+Fish	Published § 304(a) Human Health Values* Fish	RfD mg/kg-dy	Published § 304(a) Updated § 304(a) IRIS Information q1* kg-dy/mg	Published § 304(a) Updated § 304(a) IRIS Information BCF l/kg
1	•Acenaphthene	83-32-9	-	-	-	20 #	-	1200 (20#)	2700	0.06	-	242
2	Acrolein	107-02-8	-	-	-	320	780	320	780	-	-	215
3	Acrylonitrile (c)	107-13-1	-	-	-	0.058	0.65	0.059	0.66	-	0.54	30
4	Benzene (c)	71-43-2	-	-	-	0.66	40	1.2	71	-	0.029	5.2
5	Benzidine (c)	92-87-5	-	-	-	0.00012	0.00053	0.00012	0.00054	0.003	230	87.5
6	Carbon tetrachloride (c) (Tetrachloromethane)	56-23-5	-	-	-	-	-	-	-	-	0.40	6.94 0.254.4 0.00070 .13 18.75
7	Chlorobenzene (Monochlorobenzene)	108-90-7	-	-	-	20 #(488)	-	680m(20#)	21000	0.02	-	10.3
8	•1,2,4-Trichlorobenzene	120-82-1	-	-	-	-	-	260 m	940	0.01	-	114
9	•Hexachlorobenzene (c)	118-74-1	-	-	-	0.00072	0.00074	0.00075	0.00077	0.0008	1.6	8690
10	1,2-Dichloroethane (c)	107-06-2	-	-	-	0.94	243	0.38	99	-	0.091	1.2
11	•1,1,1-Trichloroethane	71-55-6	-	-	-	-	-	-	-	-	200@(184000) 1030000	- m,ntr - ntr-- 5.6
12	Hexachloroethane (c)	67-72-1	-	-	-	1.9	8.74	1.9	8.9	0.001	0.014	86.9
13	1,1-Dichloroethane	75-34-3	-	-	-	-	-	-	-	-	-	-
14	1,1,2-Trichloroethane (c)	79-00-5	-	-	-	0.60	41.8	0.61	42	0.004	0.057	4.5
15	1,1,2,2-Tetrachloroethane (c)	79-34-5	-	-	-	0.17	10.7	0.17	11	-	0.20	5.0
16	Chloroethane (Monochloroethane)	75-00-3	-	-	-	-	-	-	-	-	-	------
17	Bis(2-chloroethyl) ether (c)	111-44-4	-	-	-	0.03	1.36	0.031	1.4	-	1.1	6.9
18	2-Chloroethyl vinyl ether (c)	110-75-8	-	-	-	-	-	-	-	-	-	0.557
19	•2-Chloronaphthalene	91-58-7	-	-	-	-	-	1700	4300	0.08	-	202
20	2,4,6-Trichlorophenol (c)	88-06-2	-	-	-	1.2	3.6	2.1	6.5	-	0.011	150
21	p-Chloro-m-cresol	59-50-7	-	-	-	-	-	-	-	-	3000#	-3000#- ---
22	Chloroform (HM) (c) (Trichloromethane)	67-66-3	-	-	-	0.19	15.7	5.7	470	0.01	0.0061	3.75
23	2-Chlorophenol	95-57-8	-	-	-	0.1 #	-	120 (0.1#)	400	0.005	-	134
24	1,2-Dichlorobenzene	95-50-1	-	-	-	400	2600	2700 m	17000	0.09	-	55.6

EPA Region VIII Criteria Chart

25	1,3-Dichlorobenzene	541-73-1	-	-	-	400	2600	400	2600	-	-	55.6

Except where indicated, all criteria are listed as micrograms per liter (ug/l). A "▸" indicates a change in § 304(a) human health values compared to the August 1990 EPA Region VIII criteria chart.

			Aquatic Life Criteria			Human Health Criteria		Published § 304(a) Human Health Values*			Published § 304(a) Updated § 304(a) IRIS Information	
	Chemical Name	CASRN	CMC	CCC	Date	Water+Fish	Fish	Water+Fish	Fish	RfD mg/kg-dy	q1* kg-dy/mg	BCF l/kg
26	1,4-Dichlorobenzene	106-46-7	-	-	-	75@(400)	2600	400 m	2600	-	-	55.6
27	3,3'-Dichlorobenzidine (c)	91-94-1	-	-	-	0.01	0.02	0.039	0.077	-	0.45	312
28	1,1-Dichloroethylene (c)	75-35-4	-	-	-	0.033	1.85	0.057	3.2	0.009	0.6	5.6
29	1,2-trans-Dichloroethylene	156-60-5	-	-	-	-	-	700 m	140000	0.02	-	1.58
30	2,4-Dichlorophenol	120-83-2	-	-	-	0.3 #(3090)	-	93 (0.3#)	790	0.003	-	40.7
31	▸1,2-Dichloropropane						78-87-5	-	-	-	-	-0.52 x 39 x-- 4.11
32	1,3-Dichloropropylene (1,3-Dichloropropene) (cis and trans isomers)	542-75-6	-	-	-	87	14100	10	1700	0.0003	-	1.91
33	▸2,4-Dimethylphenol	105-67-9	-	-	-	400 #	-	540 (400#)	2300	0.02	-	93.8
34	2,4-Dinitrotoluene (c)	121-14-2	-	-	-	0.11	9.1	0.11	9.1	0.002	-	3.8
35	2,6-Dinitrotoluene	606-20-2	-	-	-	-	-	-	-	-	-	-
36	1,2-Diphenylhydrazine (c)	122-66-7	-	-	-	0.042	0.56	0.040	0.54	-	0.8	24.9
37	Ethylbenzene	100-41-4	-	-	-	1400	3260	3100 m	29000	0.1	-	37.5
38	▸Fluoranthene	206-44-0	-	-	-	42	54	300	370	0.04	-	1150
39	4-Chlorophenyl phenyl ether	7005-72-3	-	-	-	-	-	-	-	-	-	1200
40	4-Bromophenyl phenyl ether	101-55-3	-	-	-	-	-	-	-	-	-	1640
41	Bis(2-chloroisopropyl) ether	39638-32-9	-	-	-	34.7	4360	1400	170000	0.04	-	2.47
42	Bis(2-chloroethoxy) methane	111-91-1	-	-	-	-	-	-	-	-	-	0.64
43	Methylene chloride (HM) (c) (Dichloromethane)	75-09-2	-	-	-	0.19	15.7	4.7	1600	0.06	0.0075	0.9
44	▸Methyl chloride (HM) (Chloromethane)	74-87-3	-	-	-	0.19	15.7	- ntr	- ntr	-	-	3.75
45	Methyl bromide (HM) (Bromomethane)	74-83-9	-	-	-	0.19	15.7	48	4000	0.0014	-	3.75
46	▸Bromoform (HM) (c)	75-25-2	-	-	-	0.19	15.7	4.3	360	0.02	0.0079	3.75

EPA Region VIII Criteria Chart

	Chemical Name	CASRN	Aquatic Life Criteria CMC	Aquatic Life Criteria CCC	Date	Human Health Criteria Water+Fish	Human Health Criteria Fish	Published § 304(a) Human Health Values* Water+Fish	Published § 304(a) Human Health Values* Fish	RfD mg/kg-dy	Published § 304(a) Updated § 304(a) IRIS Information q1* kg-dy/mg	BCF l/kg
	(Tribromomethane)											
47	▸Dichlorobromomethane (HM) (c)	75-27-4	-	-	-	0.19	15.7	0.56	46	0.02	0.062	3.75
48	▸Chlorodibromomethane (HM) (c)	124-48-1	-	-	-	0.19	15.7	0.41	34	0.02	0.084	3.75
49	Hexachlorobutadiene (c)	87-68-3	-	-	-	0.45	50	0.44	50	-	0.078	2.78
50	Hexachlorocyclopentadiene	77-47-4	-	-	-	1.0 #(206)	-	240 m (1.0#)	17000	0.007	-	4.34
51	▸Isophorone (c)	78-59-1	-	-	-	5200	520000	36	2600	0.2	0.00095	4.38
52	Naphthalene	91-20-3	-	-	-	-	-	-	-	-	-	10.5
53	Nitrobenzene	98-95-3	-	-	-	30 #(19800)	-	17	1900	0.0005	-	2.89
54	2-Nitrophenol	88-75-5	-	-	-	-	-	-	-	-	-	2.33
55	4-Nitrophenol	100-02-7	-	-	-	-	-	-	-	-	-	3.31
56	2,4-Dinitrophenol	51-28-5	-	-	-	-	-	-	-	-	70	14300
57	4,6-Dinitro-o-cresol (4,6-Dinitro-2-methylphenol)	534-52-1	-	-	-	13.4	765	13	765	-	-	701400 00.002- 1.5 5.5
58	N-Nitrosodimethylamine (c)	62-75-9	-	-	-	0.0014	16	0.00069	8.1	-	51	0.026
59	N-Nitrosodiphenylamine (c)	86-30-6	-	-	-	4.9	16.1	5.0	16	-	0.0049	136
60	▸N-Nitrosodi-n-propylamine (c)	621-64-7	-	-	-	-	-	0.005	1.4	-	7.0	1.13
61	▸Pentachlorophenol (c)	87-86-5	20****	13****	9/86	30 #(1010)	-	0.28 (30#)	8.2	0.03	0.12	11
62	Phenol	108-95-2	-	-	-	300 #(3500)	-	21000 (300#)	4600000	0.6	-	1.4
63	Bis(2-ethylhexyl)phthalate (c)	117-81-7	-	-	-	15000	50000	1.8	5.9	0.02	0.014	130
64	Butyl benzyl phthalate	85-68-7	-	-	-	-	-	3000	5200	0.2	-	414
65	Di-n-butyl phthlate	84-74-2	-	-	-	35000	154000	2700	12000	0.1	-	89
66	Di-n-octyl phthlate	117-84-0	-	-	-	-	-	-	-	-	-	------
67	Diethyl phthalate 84-66-2	-	-	-	350000	1800000	23000	120000	0.8	-	73	
68	Dimethyl phthlate	131-11-3	-	-	-	313000	2900000	310000	2900000	-	-	36
69	▸Benzo(a)anthracene (PAH) (c) (1,2-Benzanthracene)	56-55-3	-	-	-	0.0028	0.0311	0.0044	0.049	-	-	30
70	▸Benzo(a)pyrene (PAH) (c) (3,4-Benzopyrene)	50-32-8	-	-	-	0.0028	0.0311	0.0044	0.049	-	7.3	30

Except where indicated, all criteria are listed as micrograms per liter (ug/l). A "▸" indicates a change in § 304(a) human health values compared to the August 1990 EPA Region VIII criteria chart.

EPA Region VIII Criteria Chart

71 ›Benzo(b)fluoranthene (PAH) (c) (3,4-Benzofluoranthene)	205-99-2	-	-	-	0.0028	0.0311	0.0044	0.049	-	-	30
72 ›Benzo(k)fluoranthene (PAH) (c) (11,12-Benzofluoranthene)	207-08-9	-	-	-	0.0028	0.0311	0.0044	0.049	-	-	30
73 ›Chrysene (PAH) (c)	218-01-9	-	-	-	0.0028	0.0311	0.0044	0.049	-	-	30
74 ›Acenaphthylene (PAH)	208-96-8	-	-	-	0.0028	0.0311	- ntr	- ntr	-	-	30
75 ›Anthracene (PAH)	120-12-7	-	-	-	0.0028	0.0311	9600	110000	0.3	-	30

Except where indicated, all criteria are listed as micrograms per liter (ug/l). A "›" indicates a change in § 304(a) human health values compared to the August 1990 EPA Region VIII criteria chart.

Chemical Name	CASRN	Published § 304(a) Aquatic Life Criteria CMC	CCC	Date	Published § 304(a) Human Health Criteria Water+Fish	Fish	Updated § 304(a) Human Health Values* Water+Fish	Fish	IRIS Information RfD mg/kg-dy	q1* kg-dy/mg	BCF l/kg
76 ›Benzo(g,h,i)perylene (PAH) (1,12-Benzoperylene)	191-24-2	-	-	-	0.0028	0.0311	- ntr	- ntr	-	-	30
77 ›Fluorene (PAH) 86-73-7	-	-	-	0.0028	0.0311	1300	14000	0.04	-	30	
78 ›Phenanthrene (PAH)	85-01-8	-	-	-	0.0028	0.0311	- ntr	- ntr	-	-	30
79 ›Dibenzo(a,h)anthracene (PAH)(c) (1,2,5,6-Dibenzanthracene)	53-70-3	-	-	-	0.0028	0.0311	0.0044	0.049	-	-	30
80 ›Indeno(1,2,3-cd)pyrene (PAH)(c)	193-39-5	-	-	-	0.0028	0.0311	0.0044	0.049	-	-	30
81 ›Pyrene (PAH)	129-00-0	-	-	-	0.0028	0.0311	960	11000	0.03	-	30
82 Tetrachloroethylene (c)	127-18-4	-	-	-	0.8	8.85	0.80	8.9	0.01	-	30.6
83 Toluene	108-88-3	-	-	-	14300	424000	6800 m	200000	0.2	-	10.7
84 Trichloroethylene (c)	79-01-6	-	-	-	2.7	80.7	2.7	81	-	-	10.6
85 Vinyl chloride (c) (Cloroethylene)	75-01-4	-	-	-	2.0 @	525	2.0 @	530	-	-	1.17
86 Aldrin (c)	309-00-2	3.0 (1.5**)	-	10/80	0.000074	0.000079	0.00013	0.00014	0.00003	17	4670
87 Dieldrin (c)	60-57-1	2.5 (1.25**)	0.0019	10/80	0.000071	0.000076	0.00014	0.00014	0.00005	16	4670
88 Chlordane (c)	57-74-9	2.4 (1.2**)	0.0043	10/80	0.00046	0.00048	0.00057	0.00059	0.00006	1.3	14100
89 4,4'-DDT (c)	50-29-3	1.1(.55**)	0.001	10/80	0.000024	0.000024	0.00059	0.00059	0.0005	0.34	53600
90 4,4'-DDE (c)	72-55-9	-	-		0.000024	0.000024	0.00059	0.00059	-	0.34	53600
91 4,4'-DDD (c)	72-54-8	-	-	-	0.000024	0.000024	0.00083	0.00084	-	0.24	53600
92 ›alpha-Endosulfan	115-29-7	0.22 (.11**)	0.056	10/80	74	159	110 p	240 p	0.006 p	-	270
93 ›beta-Endosulfan	115-29-7	0.22 (.11**)	0.056	10/80	74	159	110 p	240 p	0.006 p	-	270
94 ›Endosulfan sulfate	1031-07-8	-	-	-	74	159	110 p	240 p	0.006 p	-	270
95 Endrin	72-20-8	0.18 (.09**)	0.0023	10/80	0.2 @	-	0.76	0.81	0.0003	-	3970

EPA Region VIII Criteria Chart

96 Endrin aldehyde	7421-93-4	-	-	-	0.2 @	-	0.76	0.81	0.0003	-	3970
97 Heptachlor (c)	76-44-8	0.52 (.26**)	0.0038	10/80	0.00028	0.00029	0.00021	0.00021	0.0005	4.5	11200
98 Heptachlor epoxide (c)	1024-57-3	0.52 (.26**)	0.0038	10/80	0.00028	0.00029	0.00010	0.00011	0.000013	9.1	11200
99 alpha-BHC (c) (Hexachlorocyclohexane-alpha)	319-84-6	-	-	-	0.0092	0.031	0.0039	0.013	-	6.3	130
100 beta-BHC (c) (Hexachlorocyclohexane-beta)	319-85-7	-	-	-	0.016	0.055	0.014	0.046	-	1.8	130

Except where indicated, all criteria are listed as micrograms per liter (ug/l). A "▸" indicates a change in § 304(a) human health values compared to the August 1990 EPA Region VIII criteria chart.

							Published § 304(a)			Published § 304(a) Updated § 304(a)IRIS Information	
		Aquatic Life Criteria			Human Health Criteria		Human Health Values*		RfD	q1*	BCF
Chemical Name	CASRN	CMC	CCC	Date	Water+Fish	Fish	Water+Fish	Fish	mg/kg-dy	kg-dy/mg	l/kg
101 gamma-BHC (Lindane) (c) (Hexachlorocyclohexane-gamma)	58-89-9	2.0 (1**)	0.08	10/80	0.019	0.063	0.019	0.063	0.0003	-	130
102 delta-BHC (Hexachlorocyclohexane-delta)	319-86-8	-	-	-	-	-	-	-	-	-	130
103 PCB 1242 (Arochlor 1242) (c)	1336-36-3	-	0.014	10/80	0.000079	0.000079	0.000044	0.000045	-	7.7	31200
104 PCB-1254 (Arochlor 1254) (c)	1336-36-3	-	0.014	10/80	0.000079	0.000079	0.000044	0.000045	-	7.7	31200
105 PCB-1221 (Arochlor 1221) (c)	1336-36-3	-	0.014	10/80	0.000079	0.000079	0.000044	0.000045	-	7.7	31200
106 PCB-1232 (Arochlor 1232) (c)	1336-36-3	-	0.014	10/80	0.000079	0.000079	0.000044	0.000045	-	7.7	31200
107 PCB-1248 (Arochlor 1248) (c)	1336-36-3	-	0.014	10/80	0.000079	0.000079	0.000044	0.000045	-	7.7	31200
108 PCB-1260 (Arochlor 1260) (c)	1336-36-3	-	0.014	10/80	0.000079	0.000079	0.000044	0.000045	-	7.7	31200
109 PCB-1016 (Arochlor 1016) (c)	1336-36-3	-	0.014	10/80	0.000079	0.000079	0.000044	0.000045	-	7.7	31200
110 Toxaphene (c)	8001-35-2	0.73	0.0002	9/86	0.00071	0.00073	0.00073	0.00075	-	1.1	13100
111 Antimony	7440-36-0	-	-	-	146	45000	14 m	4300	0.0004	-	1.0
112 Arsenic (c)	7440-38-2	360	190	1/85	0.002	0.017	0.018	0.14	0.0003	1.75	44
113▸Asbestos (c)	1332-21-4	-	-	-	30000 fibers/l	-	7000000@ f/l	-	-	-	
114 Beryllium (c)	7440-41-7	-	-	-	0.0037	0.064	0.0077 ntr	0.13 ntr	0.005	4.3	19
115▸Cadmium	7440-43-9	3.9***	1.1***	1/85	10@(29)	-	14 m,ntr	84 ntr	0.0005	-	64
116 Chromium (III)	7440-47-3	1700***	210***	1/85	50@(170000)	3433000	33000 m,ntr	670000 ntr	1.0	-	16
Chromium (VI)		16	11	1/85	50@	-	170 m,ntr	3400 ntr	0.005		16
117▸Copper	7440-50-8	18***	12***	1/85	1000#	-	1300x 1000#	-	-	-	36
118 Cyanide (total)	57-12-5	22	5.2	1/85	200 @	-	700	220000	0.02	-	1.0

EPA Region VIII Criteria Chart

119 Lead	7439-92-1	82***	3.2***	1/85	50 @	-	- ntr,m	-	-	-	49
120 Mercury	7439-97-6	2.4	0.012	1/85	0.144	0.146	0.14	0.15	-	-	5500
121 Nickel	7440-02-0	1400***	160***	9/86	13.4	100	610 m	4600	0.02	-	47
122 Selenium	7782-49-2	20	5	9/87	10 @	-	170 m,ntr	9000 ntr	0.005	-	6.0
123 Silver	7440-22-4	4.1***	-	10/80	50 @	-	170 ntr	110000 ntr	0.005	-	0.5
124 Thallium	7440-28-0	-	-	-	13	48	1.7	6.2	0.000068	-	119
125 Zinc	7440-66-6	120***	110***	2/87	5000 #	-	9100 (5000#)	69000	0.3	-	47
126 Dioxin (2,3,7,8-TCDD) (c)	1746-01-6	-	-	-	0.000000013	0.000000014	0.000000013	0.000000014	-	-	5000

This chart lists all 126 of EPA's priority toxic pollutants whether or not criteria recommendations are available. A "-" indicates the absence of criteria recommendations or other information. For carcinogens, the displayed values reflect a 10^{-6} incremental risk factor. Except where indicated, all criteria are listed as micrograms per liter (ug/l). A "▸" indicates a change in § 304(a) human health values compared to the August 1990 EPA Region VIII criteria chart.

OTHER POLLUTANTS w/§ 304(a) CRITERIA

			Aquatic Life Criteria			Human Health Criteria		Published § 304(a) Human Health Values*			Published § 304(a) Updated § 304(a) IRIS Information	
	Chemical Name	CASRN	CMC	CCC	Date	Water+Fish	Fish	Water+Fish	Fish	RfD mg/kg-dy	q1* kg-dy/mg	BCF l/kg
1	Aluminum (pH 6.5-9.0 only)	7429-90-5	750	87	8/88	-	-	-	-	-	-	-
2	Ammonia	7664-41-7	♦	♦	1/85	-	-	-	-		-	-
3	Barium	7440-39-3	-	-	-	1000@ rb	-	1000@ rb	-	0.07	-	-
4	Bis(chloromethyl) Ether (c)	542-88-1	-	-	-	0.00000376	0.00184	0.00016	0.078	-	220	0.63
5	Chloride	16887-00-6	860000	230000	2/88	-	-	-	-	-	-	-
6	Chlorine (TRC)	7782-50-5	19	11	1/85	-	-	-	-	-	-	-
7	Chlorpyrifos	2921-88-2	0.083	0.041	9/86	-	-	-	-	-	-	-
8	Demeton	8065-48-3	-	0.1 rb	7/76	-	-	-	-	-	-	-
9	Dichlorodifluoromethane (HM)	75-71-8	-	-	-	0.19	15.7	6900	570000	0.2	-	3.75
10	2,4-dichlorophenoxy acetic acid (2,4-D)	94-75-7	-	-	-	100@ rb	-	100@ rb m	-	0.01	-	-
11	Dissolved gases	-	110% sat. rb		7/76	-	-	-	-	-	-	-
12	Dissolved oxygen	7782-44-7	♣	♣	4/86							
13	Dissolved solids	-	-	-	-	see rb	-	see rb	-	-	-	-
14	Guthion	86-50-0	-	0.01 rb	7/76	-	-	-	-	-	-	-
15	Iron	7439-89-6	-	1000 rb	7/76	300@ rb	-	300@ rb	-	-	-	-
16	Malathion	121-75-5	-	0.1 rb	7/76	-	-	-	-	0.02	-	-
17	Manganese	7439-96-5	-	-	-	50@ rb	-	50@ rb	-	0.005	-	-
18	Methoxychlor	72-43-5	-	0.03 rb	7/76	100@ rb	-	100@ rb m	-	0.005	-	-
19	Mirex	2385-85-5	-	0.001 rb	7/76	-	-	-	-	0.0002	-	-
20	Nitrates (as N)	14797-55-8	-	-	-	10000@ rb	-	10000@ rb	-	1.6	-	-

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21	N-nitrosopyrrolidene (c)	930-55-2	-	-	-	0.016	91.9	0.017	93	-	2.1	0.055
22	Oil and Grease	-	-	& rb	7/76	-	-	-	-	-	-	-
23	Parathion	56-38-2	0.065	0.013	9/86	-	-	-	-	-	-	-
24	Pentachlorobenzene	608-93-5	-	-	-	74	85	3.5	4.1	0.0008	-	2125
25	Solids	-	-	+ rb	-	-	-	-	-	-	-	-
26	Sulfide-Hydrogen Sulfide	7783-06-4	-	2 rb	7/76	-	-	-	-	-	-	-
27	1,2,4,5-tetrachlorobenzene	95-94-3	-	-	-	38	48	2.3	2.9	0.0003	-	1125
28	Trichlorofluoromethane (HM)	75-69-4	-	-	-	0.19	15.7	10000	860000	0.3	-	3.75
29	2,4,5-trichlorophenol	95-95-4	-	-	-	1#(2600)	-	2600(1#)	9800	0.1	-	110
30	2-(2,4,5-trichlorophenoxy)-proprionic acid (2,4,5-TP)	93-72-1	-	-	-	10@ rb	-	10@ rb	-	0.008	-	-

This chart lists pollutants not listed in CWA § 307(a) for which EPA has issued criteria guidance under CWA § 304(a). A "-" indicates the absence of criteria recommendations or other information. For carcinogens, the displayed values reflect a 10^{-6} incremental risk factor. Except where indicated, all criteria are listed as micrograms per liter (ug/l).

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ACRONYMS

CASRN Chemical Abstracts Service Registry Number
BCF Bioconcentration Factor (liters/kg).
CMC Criterion Maximum Concentration (acute exposure value). The threshold value at or below which there should be no unacceptable effects to freshwater aquatic organisms and their uses if the one-hour concentration does not exceed that CMC value more than once every three years on the average.
CCC Criterion Continuous Concentration (chronic exposure value). The threshold value at or below which there should be no unacceptable effects to freshwater aquatic organisms and their uses if the four-day concentration does not exceed that CCC value more than once every three years on the average.
IRIS EPA's Integrated Risk Information System. Updated human health criteria reflect current Agency cancer slope factors (q1*) or reference dose (RfD) information as contained in IRIS.
PAH Polynuclear Aromatic Hydrocarbons; see note below under FURTHER INFORMATION.
HM Halomethanes; see note below under FURTHER INFORMATION.

FOOTNOTES

(c) Carcinogens: chemicals classified by EPA as carcinogens for an oral route of exposure; includes A, B1, B2 and C carcinogens.
‣ Indicates a change in § 304(a) human health values compared to the August 1990 EPA Region VIII criteria chart.
# Indicates criteria which are based on organoleptic (taste and odor) effects. Organoleptic-based criteria were recommended in the 1980 criteria documents either where the organoleptic endpoint resulted in a more stringent value than the toxicity-based endpoint or where there were not sufficient data to calculate a toxicity-based criterion. In the chart above, in the "published" criteria column, the organoleptic value is listed first and the toxicity-based value, if available, is indicated in parentheses; in the "updated" criteria column, the organoleptic-based criterion, if any, is indicated in parentheses. EPA did not include organoleptic-based criteria in the National Toxics Rule, and adoption of these criteria is not required to satisfy CWA § 303(c)(2)(B) requirements. However, adoption of these criteria may be advisable to ensure full protection of designated and existing uses.
@ Indicates criteria based on drinking water MCL (the calculated § 304(a) toxicity-based value, if any, is indicated in parentheses).
* This column shows either the original published § 304(a) criteria or updated values based on current IRIS information. Where possible, values are listed in the "updated" column based on IRIS information even if no criteria document has been published to date by EPA. See also FURTHER INFORMATION below.
** Aquatic life criteria for these pesticides were issued in 1980, and at that time, acute values were intended to be interpreted as instantaneous maximum values. The modified acute criteria in the above chart approximate current Agency guidance for deriving CMC values (i.e., current guidance: CMC = FAV/2; therefore, for the modified CMC values listed above, the 1980 final acute value (FAV) is simply divided by 2; these modified values would also include the current averaging periods and frequency statement; see the information on CMCs and CCCs above, and the Guidelines for Deriving Numerical Water Quality Criteria for the Protection of Aquatic Organisms and their Uses, EPA-1985).
ntr Indicates that, although a criteria recommendation and criteria document have been published, EPA did not promulgate human health criteria in the National Toxics Rule. Refer to the NTR for the Agency's rationale. Where criteria continue to be listed, it is because either an RfD or q1*, as appropriate, is currently listed in IRIS.
x For copper and 1,2-dichloropropane, there is no RfD listed in IRIS, but human health criteria guidance was included in the National Toxics Rule. The "updated values" listed for these two pollutants are found in the final National Toxics Rule 57 FR 60890, December 22, 1992.

m Indicates more-stringent MCL has been issued by EPA under the Safe Drinking Water Act. Refer to drinking water regulations (summary

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chart available) or Safe Drinking Water Hotline (1-800-426-4791).

p The RfD and "updated" criteria for endosulfan are pending; the RfD has been verified but has not yet been entered into IRIS.

*** = Freshwater aquatic life criteria for these metals are expressed as a function of total hardness (mg/l, CaCO3). The values displayed in the chart correspond to a total hardness of 100 mg/l. The hardness relationship is as follows:

	CMC = exp{ma[ln(hardness)]+ba}		CCC = exp{mc[ln(hardness)]+bc}	
	ma	ba	mc	bc
cadmium	1.128	-3.828	0.7852	-3.490
copper	0.9422	-1.464	0.8545	-1.465
chromium (III)	0.8190	3.688	0.8190	1.561
lead	1.273	-1.460	1.273	-4.705
nickel	0.8460	3.3612	0.8460	1.1645
silver	1.72	-6.52	-	-
zinc	0.8473	0.8604	0.8473	0.7614

**** = Freshwater aquatic life criteria for pentachlorophenol are expressed as a function of pH. Values displayed in the chart correspond to a pH of 7.8 and are calculated as follows:

$CMC = \exp[1.005(pH) - 4.830]$ $CCC = \exp[1.005(pH) - 5.290]$

rb Indicates that the criterion was published in the Red Book, *Quality Criteria for Water*, EPA (1976).

& The Red Book oil and grease criterion to protect aquatic life reads in part: "levels of individual petrochemicals in the water column should not exceed 0.01 of the lowest continuous flow 96-hour LC_{50} to several important freshwater or marine species, each having a demonstrated high susceptibility to oils and petrochemicals."

+ Red Book solids criterion to protect aquatic life reads as follows: "settleable and suspended solids should not reduce the depth of the compensation point for photosynthetic activity by more than 10 percent from the seasonally established norm for aquatic life."

♦ Freshwater aquatic life criteria for ammonia (mg/l NH_3) are expressed as a function of pH and temperature. Since the criteria document was first issued, there has been a change to the recommended acute-chronic ratios at each of the two pH ranges used in calculating the CCC. The original CMC equation and the revised CCC equation are as follows:

$CMC^1 = 0.52/FT/FPH/2$ where:

FT	$= 10^{0.03(20-TCAP)}$	; $TCAP \leq T \leq 30$
	$= 10^{0.03(20-T)}$	; $0 \leq T < TCAP$
FPH	$= 1$	; $8 \leq pH \leq 9$
	$= (1 + 10^{7.4-pH})/1.25$	; $6.5 \leq pH < 8$
TCAP	= 20 C	; Salmonids or other sensitive coldwater species present.
	= 25 C	; Salmonids and other sensitive coldwater species absent.

[1] The usual CMC averaging period of one hour may not be appropriate if excursions of concentrations to greater than 1.5 times the average occur during the hour; in such cases, a shorter averaging period may be needed. To convert these values to mg/l N, multiply by 0.822.

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$CCC^2 = 0.80/FT/FPH/RATIO$ where FT and FPH are as above and:

$$\begin{aligned} RATIO &= 13.5 && ; 7.7 \leq pH \leq 9 \\ &= 20(10^{7.7-pH}/1 + 10^{7.4-pH}) && ; 6.5 \leq pH < 7.7 \\ TCAP &= 15\ C && ; \text{Salmonids/other sensitive coldwater species present.} \\ &= 20\ C && ; \text{Salmonids/other sensitive coldwater species absent.} \end{aligned}$$

[2] Because these formulas are nonlinear in pH and temperature, the criterion should be the average of separate evaluations of the formulas reflective of the fluctuations of flow, pH, and temperature within the averaging period; it is not appropriate in general to simply apply to formula to average pH, temperature and flow. To convert these values to mg/l N, multiply by 0.822.

♣ Freshwater aquatic life criteria for dissolved oxygen are as follows:

	Coldwater Criteria		Warmwater Criteria	
	Early Life Stages[1,2]	Other Life Stages	Early Life Stages[2]	Other Life Stages
30 Day Mean	NA[3]	6.5	NA	5.5
7 Day Mean	9.5 (6.5)	NA	6.0	NA
7 Day Mean Minimum	NA	5.0	NA	4.0
1 Day Minimum[4,5]	8.0 (5.0)	4.0	5.0	3.0

[1] These are water column concentrations recommended to achieve the required intergravel dissolved oxygen concentrations shown in parentheses. The 3 mg/l differential is discussed in the criteria document. For species that have early life stages exposed directly to the water column, the figures in parentheses apply.

[2] Includes all embryonic and larval stages and all juvenile forms to 30-days following hatching.

[3] NA (not applicable).

[4] For highly manipulatable discharges, further restrictions apply (see page 37 of criteria document).

[5] All minima should be considered as instantaneous concentrations to be achieved at all times.

FURTHER INFORMATION

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Updated Human Health Values/IRIS

- The reference dose (RfD) and cancer slope factor (q1*) values used to calculate the criteria listed in this chart are found in either EPA's 1980 ambient water quality criteria documents or IRIS. The entries in IRIS represent the current Agency position; and therefore, IRIS information supercedes any values previously developed. IRIS information is updated monthly. The IRIS values listed in the chart are those entered in IRIS as of July 1, 1993. For those chemicals for which there are no reference dose or cancer slope factor values currently listed in IRIS, the 1980 values still apply as Agency guidance.

- In a number of instances the reference dose or cancer slope factor listed in IRIS is very similar to (e.g., see toxaphene) or the same as (e.g., see hexachlorobutadiene) the values listed in the 1980 criteria documents. Listing of information in IRIS allowed calculation of "updated" values for this chart; however, where the IRIS values are the same as those in the 1980 criteria documents, the difference between the 1980 criteria and the "updated" values is simply a rounding difference (see below). Reference doses and cancer slope factors are validated, at the request of the Program offices, by two separate Agency workgroups made up of Agency scientists from all of the Program offices and the Office of Research and Development. Values listed in IRIS have gone through this review process subsequent to the development of the 1980 criteria documents. Where the IRIS values are unchanged from those developed in 1980, the IRIS information may be viewed as continued confirmation of the values developed for the 1980 criteria documents.

- All of the updated values are rounded to two significant figures. Use of more than two significant figures implies a precision that is likely unwarranted. In some instances, the 1980 criteria values may have more than two significant figures; those values are listed as published in the criteria documents.

- For several chemicals classified as carcinogens, IRIS lists a new reference dose but no new cancer slope information (e.g., 2,4-dinitrotoluene). In such cases, a change in the "updated values" column was not made where the calculated value based on the new reference dose information (non-carcinogenic endpoint) was less stringent than the existing 1980 value based on a carcinogenic endpoint.

Halomethanes and PAHs

- In 1980, criteria for halomethanes (HMs) and polynuclear aromatic hydrocarbons (PAHs) were calculated for HMs and PAHs as classes of chemicals; and therefore, the criteria were applied to total HMs and total PAHs. This approach was taken both because there were insufficient data to calculate individual criteria and because the environmental exposure pathway for these chemicals would likely involve contact with complex HM or PAH mixtures. Carcinogenicity was the endpoint upon which the criteria were based. The cancer slope factor (q1*) for chloroform was used in calculating the criteria for HMs, and the benzo(a)pyrene cancer slope factor was used in the calculation of criteria for PAHs. Several individual chemicals within these two classes, however, were not specifically classified as carcinogens in 1980. In this chart, the updated values for HMs and PAHs reflect the Agency's most recent decisions on these two classes of compounds. For HMs, certain chemicals (e.g., methyl choride) are no longer treated as carcinogens, and because no RfD is listed in IRIS, no criteria are included in the "updated" values column. For other HMs (e.g., methyl bromide), the chemical is no longer treated as a carcinogen but RfD-based criteria (based on IRIS) are provided as the "updated" values. The remaining HMs (e.g., bromoform) are still treated as carcinogens and the criteria are based on individual q1*s for each chemical. For PAHs, similarly, certain chemicals (e.g., acenaphthylene) are no longer treated as carcinogens and because no RfD is listed in IRIS, no criteria are included in the "updated" values column. Other PAHs (e.g., anthracene) are no longer treated as carcinogens and RfD-based criteria (based on IRIS) are provided. The remaining PAHs are still treated as carcinogens and the updated q1* for benzo(a)pyrene is the basis for the "updated" criteria.

Calculation of Human Health Criteria

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Water + Fish

- The "water + fish" column under the heading of human health criteria lists values which are calculated based on a lifetime exposure via consumption of drinking water (2 liters per day) and contaminated aquatic organisms (6.5 grams per day).

  . For non-carcinogens, the equation used to calculate a criterion is:

$$\text{Criterion (ug/l)} = \frac{\text{RfD x 70 x (1000 ug/mg)}}{\text{2 + (0.0065 x BCF)}}$$

  . For carcinogens, the equation used to calculate a criterion is:

$$\text{Criterion (ug/l)} = \frac{\text{70 x RF x (1000 ug/mg)}}{\text{q1* [2 + (0.0065 x BCF)]}}$$

Where:

. RfD = verified reference dose for non-carcinogens mg/(kg-day)
. q1* = cancer slope factor (kg-day)/mg
. BCF = bioconcentration factor (liters/kg)
. 0.0065 = daily fish consumption (kg/day)
. 2 = daily drinking water consumption (liters/day)
. 70 = weight of an adult (kg)
. RF = incremental risk factor (10-6 used in these calculations)

Fish Only

- The "fish only" column under the heading of human health criteria lists values which are calculated based on exposure via consumption of contaminated aquatic organisms only (6.5 grams per day).

  . For non-carcinogens, the equation used to calculate a criterion is:

$$\text{Criterion (ug/l)} = \frac{\text{RfD x 70 x (1000 ug/mg)}}{\text{0.0065 x BCF}}$$

  . For carcinogens, the equation used to calculate a criterion is:

$$\text{Criterion (ug/l)} = \frac{\text{70 x RF x (1000 ug/mg)}}{\text{}}$$

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$$q1^* (0.0065 \times BCF)$$

Where:

- RfD = verified reference dose for non-carcinogens mg/(kg-day)
- q1* = cancer slope factor (kg-day)/mg
- BCF = bioconcentration factor (liters/kg)
- 0.0065 = daily fish consumption (kg/day)
- 70 = weight of an adult (kg)
- RF = incremental risk factor (10-6 used in these calculations)

- In the above equations, the first three coefficients are chemical-specific. RfD and q1* information is available from IRIS or 1980 criteria documents. BCFs are listed in the chart; additional information is available from EPA criteria documents and EPA's AQUIRE data base. The next three coefficients are exposure assumptions which may be adjusted to reflect site-specific circumstances (although the adjustments generally follow a rather standardized convention, e.g., 70 kg for an adult or 10 kg for a child are common weight assumptions). For purposes of this chart, the values listed above were used in calculating all of the criteria. The daily fish (contaminated aquatic organism) consumption coefficient is the one most likely to vary based on site-specific information. See the Agency's *Technical Support Document for Water Quality-Based Toxics Control* for more information on alternative, technically-defensible fish consumption rate assumptions.

Fish Tissue Criteria

- To translate a "fish only" water column criterion into a fish tissue criterion, use the following equation:

  Fish tissue criterion (mg/kg) = "fish only" criterion (ug/l) x BCF (l/kg) x (mg/1000 ug).

  For example, for Acrylonitrile:

  Fish tissue criterion = 0.66 ug/l x 30 l/kg x (mg/1000 ug)
  = 0.020 mg/kg